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VOL LXII 15 APRIL 1950 No 1605

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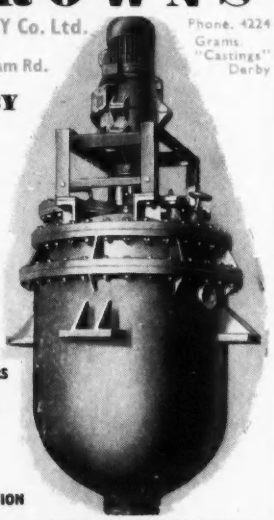

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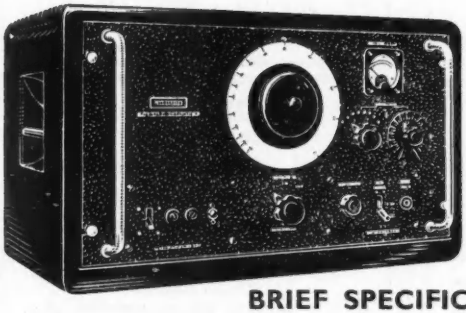

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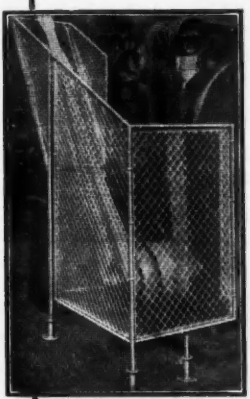

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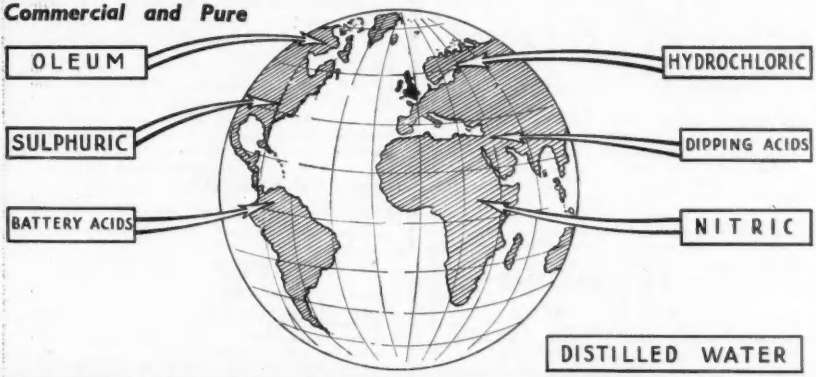

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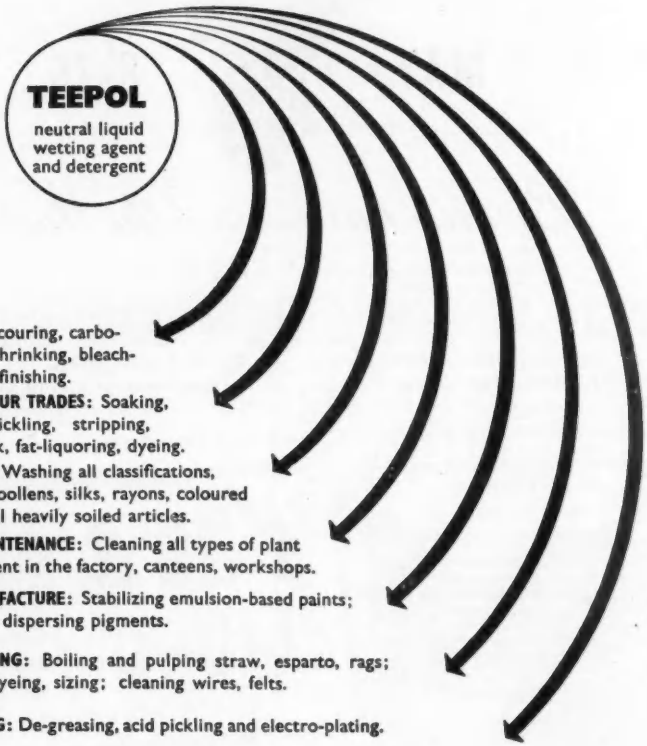

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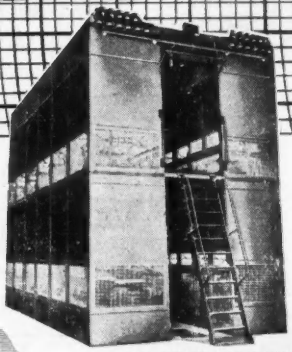

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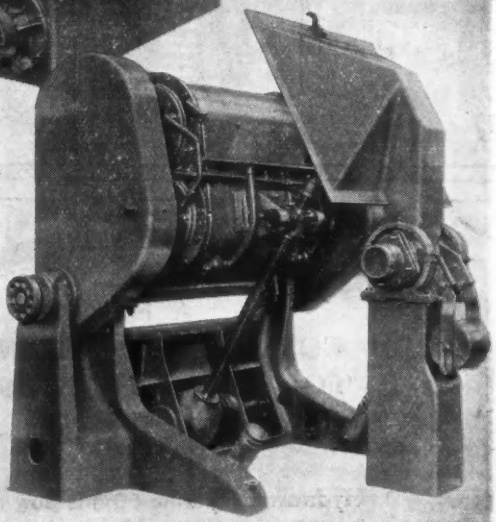

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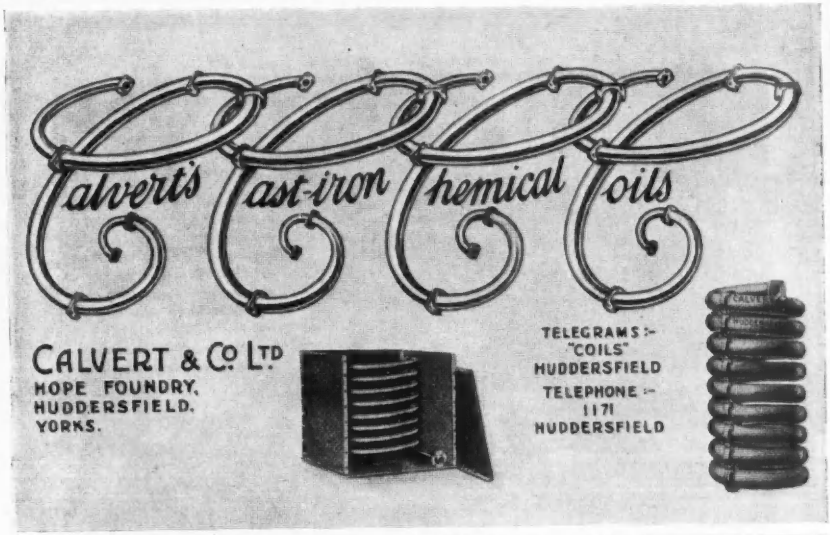

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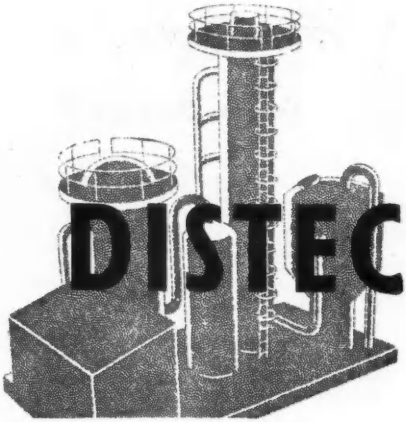

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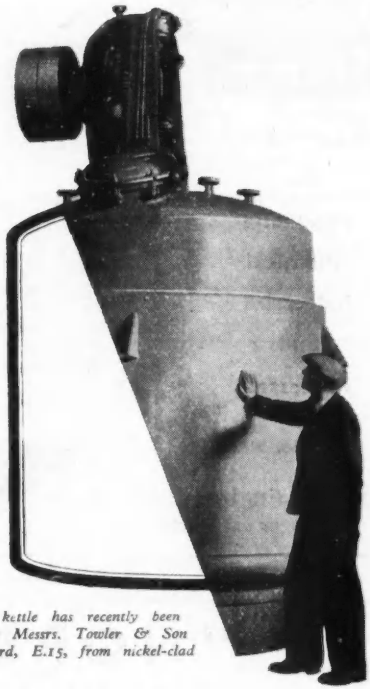

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Volume LXII 15 April 1950 Number 1605

Scientific Writ

"THE inability of most British scientists to write even a proper scientific paper, let alone a popular article, is now causing such general concern that a number of big firms and scientific societies are appointing advisers in English literature to help their inarticulate colleagues to express themselves intelligibly and with precision. It will take a long time for this movement to produce much effect, and it is a question whether the regular writing of English essays should not become a part of the university training of every science undergraduate." This broadside was fired by the editor of *Science News* (Penguin Books, March, 1950) in its latest and fifteenth issue. Mr. J. L. Crammer, the editor, reveals that from its first publication in 1946, *Science News* has never been showered with suitable or near-suitable articles; it has had "to wring contributions out of authors".

Mr. Crammer is, of course, associating himself with the view of the majority when he deplores the poor performance of some scientists at the writing desk. There are distinguished exceptions; but the Institute of Physics, the Royal Institute of Chemistry and the Institutions of Civil Engineers and of Electrical Engineers, in their recommendations for post-war education were each moved to emphasise the need for improvement in the general standard of literacy and suggested that this might be achieved if more attention was given to this kind of training at the universities. Mr. Crammer's suggestion about essay writing as a basic step is obviously sound. It has in mind the paradox that specialised courses in, say, chemistry may be compulsorily associated with courses in physics, mathematics, French, and German, yet not with the language in which all the future work of the scientist is likely to be expressed. It should not be supposed that familiarity with the essay form and cultivation of "a literary style" would be enough. The lucid presentation of scientific facts, ideas, and arguments is in itself a specialised branch of writing, and if tomorrow's scientists are to be better equipped than today's they will require specialised instruction.

Most of the literary styles that produce delightful results in the hands of the essayists cannot by any means be made to serve the needs of a scientific statement of facts. Most of the leavening devices of stylists are subjective, and science, even popular science in its best sense, cannot afford

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to abandon objectivity in its presentation. The essay, especially in the universities where the need to express more or less original ideas may be expected to be met for the first time, can, however, certainly instil the principles of clear and simple writing as well as something of its architecture. Something more is needed to convert that basic ability into a faculty for interpreting science to such differing readerships as (a) other scientists, (b) business colleagues, and (c) the general public or certain sections of it.

Too many scientists have intolerantly assumed that the production of papers for scientific journals is the most that can be asked of them. Somewhat unfortunately, the application of science depends in one respect upon its comprehension by many people who are usually not scientists at all—directors of industry, politicians, administrators, and possibly the journalists who help to form public opinion. It is futile to deplore the neglect of scientific developments if the primary responsibility of explaining the possibilities has itself been neglected.

It is in this field of expression, in the report to industrial or government administrators, that scientists most often display their weakness as writers. It is not quite true, despite Mr Crammer's extreme condemnation, that few scientists can produce proper scientific papers. About half the papers that appear in the appropriate journals reach a passable standard and most of them achieve their somewhat limited aim; they are written by scientists for scientists, and an exceptional degree of author-reader co-operation relieves the writer of much of the burden. The sort of objectivity met there eliminates most of the decorative devices which make for easier reading; if the text is heavy laden with technical terms and a modicum of "scientific shorthand" it is not to be condemned on those grounds. In the discussion of any specialised subject among specialists the proper use of technical terms is an essential form of economy. Unhappily so many scientists make an almost identical approach to the task of writing for other types of readers, employing the same style and the same tools. Their inadequacy then is no less because it is blissfully unrealised.

What might be regarded as the blue-print for a generally acceptable standard in scientific writing has

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Notes and Comments

I.C.I. in Rhode Island

INVESTMENT of American capital in the industries of other countries was one of the recommendations offered in President Truman's "Fourth Point" in the campaign to foster economic stability around the world. American chemical industries, in common with the President, had not foreseen that it might occasionally be even more profitable to put foreign capital into U.S. industry. That is not a precise description of the acquisition by I.C.I., Ltd., of about 70 per cent of the common stock of Arnold, Hoffman and Co., the old-established chemical undertaking of Rhode Island, because the purchase will be financed by a New York Bank loan, not by drawing upon our strained dollar reserve. The enterprise, however, has apparently caused some deep—and surprised—thinking in American chemical circles, to which *Chemical Engineering News* (**28**, 12, 923) bears witness. The American chemical paper, recognising that the result of the last General Election makes rather more remote the possibility that U.K. chemical industries may become State monopolies, foresees a highly embarrassing situation if the "snatch" should ever be made.

Diplomatic Problem

"THERE is the interesting possibility, if not probability, that at some future date the British Government may have a direct competitive position in American chemical industry," observes *C. and E.N.*, and offers interesting speculation upon what would be the attitude of the U.S. Department of Justice if it did not approve of the trade practices of the Anglo-American group in Rhode Island. "Just how you cite the British Government in such a situation is but one of the intriguing possible situations . . . ", speculates the American commentator. If that grotesque misuse of Administration came about—the anomaly would not be peculiarly American. A British Chemicals Corporation would, in fact, become a competitor with the native industries in fields far wider than this. Offshoots of British chemical enterprise flourish in more than half the countries of the world. The blame would not be theirs if they then instigated the biggest "hiving off" operation on record to defend their independence, regardless of the great impoverishment here.

Telling America

A BETTER propagandist for British chemical industry than Sir Frederick Bain would be hard to find. A few weeks ago his defence of the industry and confidence in its ability to overcome present difficulties was explained to Canadian members of the SCI and the Chemical Institute of Canada. Now a report in the American *Chemical Industries* shows that the ICI deputy chairman, on his recent visit to the U.S.A., revealed some plans of British chemical manufacturers which were said to have "left some of his audience slightly wide-eyed." Sir Frederick made effective use of one of the submissions presented in the recent ABCM report, which disclosed that expenditure for research by 272 British companies was likely to be raised from £8.5 million to about £11.5 million within the next year or two, which represented about the same ratio to sales totals as in the U.S.A. Recalling that until 1924 United Kingdom chemical exports to the U.S.A. exceeded imports, he traced the decline in this position to the point in 1948 when U.K. imports were worth some £9 million and exports to the U.S.A. only £2.5 million. Sir Frederick's expressed hope that that position is not to be permanent will doubtless be shared by all who appreciate how great may be the loss to both countries if a two-way traffic cannot be re-established.

Second "Safety" Conference

ON the heels of the report of the first (1948) conference on safety in chemical works, comes the full record of its successor, for which the Association of British Chemical Manufacturers and the Royal Society for the Prevention of Accidents were responsible, in Scarborough last October. The "Second Conference on Chemical Works Safety" will find a permanent place in many works libraries. This report helps to place in perspective the sources of danger associated with chemicals, making clear that it is in the user industries that risks are most rife. The need to educate users, which the conference chairman, Sir Harry Jephcott, stressed, is made only too apparent by reports of the various mishaps which occur in the use of chemicals. In one respect Dr. Amor's paper on the toxicity of organic solvents formed almost a corollary to Sir Harry's speech. Solvents are sold in increasing quantities to people who are not chemical manufacturers, and who may be quite ignorant of the dangers. The mass of relevant data which had been tabulated to form part of this paper should leave them in no doubt. The simple explanation of the medical points involved was certainly not the least important part of this treatment of the subject. The tabular matter may in time become out-of-date, but the explanation and guidance will long hold good. Mr. S. W. Richard's paper on electrical apparatus, reviewing the present recommendations and obligations regarding permissible electric equipment, points to the unsatisfactory obscurity, particularly with regard to dusts. Makers and users are placed in a state of uncertainty which urgently needs to be clarified. The full discussion and questioning suggests that the delegates agreed with that view.

New and Strange

THE ill-will which some shortsighted people bear towards scientists is generally supposed to have been engendered by the "A-bomb" and its monstrous relative in the hydrogen department. A more immediate cause of hard feelings is also perhaps the scientist's propensity for "monkeying about" with familiar objects so that they are not what they were (even if they are generally better) or, more disconcerting, not what they seem to be. A striking example of the latter sort was the synthetic ice-cream served recently to guests at Lowestoft, whose feelings on learning (after they had eaten it) that it was made principally of herring fat from which the taste had been removed and something from seaweed—possibly alginic acid—may not have been confined to admiration of the chemists who wrought this "sea change." Things stranger than that are, of course, being done with X-rays and neutron bombardment, which in Holland are said to be producing some surprising mutations in the height and foliage of tulips and gladioli. Gardening gloves and G-M counters may yet form a strange companionship in the potting shed.

SCIENTIFIC WRIT

(*continued from page 526*)

already been published. Shortly after the war, Professor R. O. Kapp gave at University College, London, a course of lectures which made so great an impression that it had to be repeated to accommodate the students and graduates who could not gain admission the first time. Later, these lectures became the basis of an admirable book, "The Presentation of Technical Information," (Constable, 1948). Two years later, however, it is not uncommon to meet scientific people who have not yet heard of this book, which could have afforded them a great deal of help in their various tasks of exposition.

Professor Kapp's book is not of the kind to give much help in the specialised art of making the abstruse clear enough for popular assimilation. It is significant that the Chemical Society and the RIC have admitted the need to do that more fully and are not unaware how difficult that undertaking can be. That more exacting form of presenting scientific facts as well as their implications represents another challenge to master the elusive art of good scientific reporting.

STREPTOMYCIN CLAIM

Dr. Waksman's Former Assistant

A SUIT to restrain Dr. Selman A. Waksman, of Rutgers University, U.S.A., from representing himself as the sole discoverer of streptomycin has been filed in the Superior Court of Trenton, New Jersey, by Albert Schatz, associate professor at Brooklyn College.

Dr. Schatz, reports *Chemical and Engineering News*, worked as a graduate student under Dr. Waksman and in 1945 was the joint applicant for the patent. In his complaint, Dr. Schatz states that he was persuaded under duress to agree to the assignment of the patent to the Rutgers' Research and Endowment Foundation.

U.S. university officials believe the case will set important precedents for future patent litigations arising out of discoveries in which graduates have collaborated, states the American periodical.

Counsel for Dr. Waksman and the Rutgers Foundation described as "baseless and preposterous" Schatz's charge that Waksman had been guilty of fraud and coercion.

"Dr. Schatz's work prior to the discovery of streptomycin covered a period of only a few months and was performed in the capacity of a carefully supervised laboratory assistant," counsel added.

British Styrene

BRITISH Petroleum Chemicals, Ltd. (jointly owned by the Anglo-Iranian Oil Co., Ltd., and the Distillers Co., Ltd.) and Monsanto Chemicals, Ltd., announce that they have formed a new company called Forth Chemicals, Ltd. This company will be concerned in the first instance with the manufacture of monomeric styrene required by the plastics industry.

British Petroleum Chemicals, Ltd., is at present constructing the petroleum chemicals plant at Grangemouth.

Monsanto is already producing polystyrene. For the monomeric form this country has had to depend on the U.S.A.

Belgian Scientists' Visit

Six Belgian scientists are at present touring British installations to study corrosion research, at the invitation of the British Iron and Steel Research Association. They will visit BISRA's exposure stations at Brixham and Derby, after visiting the corrosion section of the Chemical Research Laboratory.

NEW ATOMIC PLANT

Second Establishment in Berkshire

CONSTRUCTION work has been started at Aldermaston, near Reading, of a new atomic energy establishment. The Ministry of Supply, making the announcement, said that completion would take several years and a substantial labour force would be employed.

As in other atomic energy establishments, precautions would be taken to ensure that no harmful effect to the neighbourhood would arise. The site was a bomber airfield during the war and has since been occupied by the Ministry of Civil Aviation.

Stations already in existence are the research establishment, Harwell, Berkshire; a planning station, Risley, Lancashire; uranium processing plant, Springfields, Lancashire; production of fissile materials at Sellafield, Cumberland; and another under construction at Capenhurst, Cheshire.

It will be recalled that construction of one of the atomic piles at Sellafield was suspended last December (THE CHEMICAL AGE, *61*, 795), following the announcement by the Prime Minister, in October, that Government departments were to reduce their expenditure.

U.S. Specialists' Visit

MR. JOHN O. HARDESTY and Dr. Kenneth G. Clark, American fertiliser experts of the specialised division of the United States Department of Agriculture, are coming to the United Kingdom next week to study some departments of fertiliser industry in which technology here is considered to be in advance of American practice.

The visitors, from the Division of Fertiliser and Agricultural Lime, Beltsville, Maryland, will visit phosphatic and compound fertiliser factories in England and Scotland. They are interested in seeing, among other things, the latest developments in advanced granulating processes.

They will be entertained to luncheon in London by the Fertiliser Manufacturers' Association and the Superphosphate Manufacturers' Association on April 20, and by the Fertiliser Society on April 21. During the afternoon of the 21st they will present a short paper to the society on their work and their organisation. They will then start a very full tour which has been arranged for them by the Fertiliser Manufacturers' Association.

Basic Chemicals in January

Satisfactory Start to the Year

PRODUCTION and stocks of basic chemicals and non-ferrous metals in the first month of this year showed an improvement over the levels of January 1949. One exception was a large reduction in stocks of industrial alcohol. Production figures in almost all main categories showed increases on a substantial scale, sulphuric acid showing a rise of more than 11,000 tons. Consumption generally remained steady, but there were increases in the employment of compound fertilisers and liming materials.

Estimated numbers employed in the chemical and allied trades in January were slightly higher than in December, and with a total (in thousands) of 445.3 showed an increase of 15.7 over the total for January 1948. Distribution of workers was as follows: coke ovens, chemicals and dyes, explosives, etc., 256.8 (188.1 men, 68.7 women); paints and varnishes, 38.2 (27.1 men, 11.1 women); oils, greases, glue, etc., 67.8 (54.3 men, 13.5 women); pharmaceuticals, toilet preparations, etc., 82.5 (42.5 men, 40.0 women).

The figures and the table given below are abstracted from the *Monthly Digest of Statistics*, No. 51.

	January, 1950 Thousand Tons			January, 1949 Thousand Tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	150.2	151.0*	—	139.0	136.0	—
Sulphur	—	28.8	71.6	—	24.6	71.4
Pyrites	—	19.0	71.0	—	19.5	57.0
Spent oxide	—	16.5	182.4	—	17.1	169.3
Molasses (cane and beet)	32.8	37.2†	259.7	44.1	24.1†	272.5
Industrial alcohol (mil. bulk gal.)	2.52	3.51	0.85	1.66	2.49	7.06
Ammonia	—	7.01	5.57	—	6.61	5.95
Superphosphate	18.5	23.1	—	18.9	20.8	—
Compound fertiliser	157.9	176.5	—	143.4	154.0	—
Liming materials	—	442.0	—	—	369.1	—
Nitrogen content of nitrogenous fertilisers	22.43	22.84	—	21.38	21.09	—
Phosphate rock	—	90.4	224.6	—	93.5	146.5
Virgin aluminium	2.52	15.0	—	2.50	17.1	—
Virgin copper	—	27.7	130.2	—	29.8	115.3
Virgin Zinc	5.61	19.2	54.1	5.08	17.1	39.9
Refined lead	5.32	14.8	60.1	4.29	13.3	24.5
Tin	2.89*	2.30	22.1*	3.18*	2.05	19.2*
Zinc concentrates	—	14.1*	65.5*	—	12.7*	30.3*
Magnesium	0.51	0.48	—	0.52	0.61	—
Pig iron	187.0	142.0	541.0	178.0	135.0	278.0
Steel ingots and castings (including alloys)	305.0	—	1,263.0	289.0	—	1,019.0
Rubber: Reclaimed	0.48‡	.048‡	2.29‡	0.35‡	0.35‡	4.27‡
Natural (including latex)	—	4.25‡	40.0‡	—	5.52‡	44.8‡
Synthetic	—	0.05‡	1.12‡	—	0.04‡	1.97‡

* December. † Distilling only. ‡ Average of five weeks.

English Lead Prospect : Reviving An Ancient Industry

DEVELOPMENT of the deep lead-ore deposits in Derbyshire has been sanctioned by the Ministry of Town and Country Planning and prospecting is to be carried out on land owned by the Derbyshire Stone Co. in the neighbourhood of Wirksworth and Matlock.

The rise in lead prices during the last 10 years has resulted in a number of efforts to revive the industry, and the present survey would be carried out by the Johannesburg Consolidated Investment Co.

Towards the end of 1948 the Barmote Court upheld the right of a workman to work a vein in a limestone quarry near Wirksworth, which, it was stated, yielded him and his colleagues more than £1000 during the year.

Lead mining is a very ancient industry in Derbyshire. There are estimated to be some 4000 odd workings in the Wirksworth area presided over by the Barmote Court which has judged claims since mediaeval times.

One difficulty of mining the lead in the Derbyshire hills has been the high water table, but it is hoped that the present project will be able to overcome this by modern methods of deep mining.

MODERN NITRIC ACID PLANT

High Pressure and Yields of Dutch System

From Our ROTTERDAM CORRESPONDENT

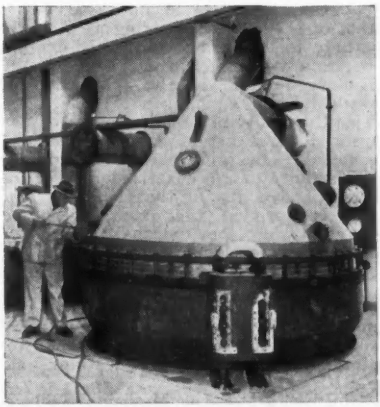
THE third plant for the manufacture of nitric acid, owned by the Dutch State coalmines and erected at Geelen (Limbourg province), is reported to have a capacity of about 820 tons of 55 per cent nitric acid, or 100 tons of nitrogen daily. It consists of three units of equal capacity, all of which will shortly be in operation.

The design was based on some of the organisation's own inventions and experience gained in operating the other two nitric acid plants. In one of these the nitric gases are absorbed under atmospheric pressure, with periodical refilling in a granite tower, and in the other absorption is achieved in horizontal Fauser cylinders.

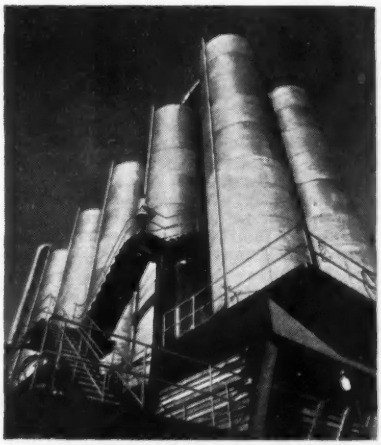
Larger Mesh Catalysts

The distinctive features of the new unit are the increased pressure under which absorption takes place, and the enlarged diameter of the heated platinum-rhodium mesh, through which the mixture of ammonia and air is passed. This method secures a satisfactory "burning" yield. Also of interest are the designs of the acid and gas cooling apparatus, by which relatively little special steel is required.

The burnt gases are first subjected to a cooling process in La Mont type boilers and then pass to hot gas coolers. A large steam output is thus achieved. The gases thereafter are compressed to 3 atm. in rotating compressors and once more cooled and led into the absorptive system through an oxidation tower.



Igniting one of the burners placed on top of a waste heat boiler



The absorption tower system for one unit having a capacity of 34 tons of nitrogen a day

The absorptive system consists of a number of stainless steel towers provided with Raschig rings. The yield is so large as to afford a total percentage of about 95 (including burnt NH_3). It is then possible to produce nitric acid of 55 to 60 per cent concentration.

The residual gases of the system are carried away by expansion turbines.

The total energy consumption by the new unit for nitric acid (including that of acid pumps, cooling water pumps, etc.) amounts to 9000 kWh per ton of nitrogen produced.

New Dutch Chemical Works

Bataafsche Petroleum Mij., an important subsidiary of the Royal Dutch Shell group, has opened its chemical factory at Pernis (Holland) to produce synthetic detergents and polyvinyl chloride products.

Parliamentary Topics

PROBLEMS of industrial dermatitis were raised last week by Dr. Barnett Stross, who asked the Minister of National Insurance how many were suffering from this disability, what was the average time lost from work, payment of claims and provision of adequate dermatological certification. Dr. Edith Summerskill stated that it was hoped to publish later in the year full information on the incidence of the disease in different areas, claims for injury and disablement and assessments made for loss of faculty. With regard to diagnosis of dermatitis, the Minister said that it was often of obscure origin, so that it was difficult to arrive at a correct prognosis. There was, unfortunately, a shortage of dermatologists.

THE number of persons due for National Service who had accepted employment as chemists under the Ministry of Supply and the inadequacy of the basic salary offered —£230 per annum—were the subjects of questions by Mr. Stanley Prescott to the Minister of Labour. Mr. G. Isaacs said 42 men who left the Universities in 1949 had accepted such posts, while 24 had declined. The basic salary offered was £312 per annum, and not the sum mentioned.

IN a written answer to Mr. Emrys Roberts regarding the composition and powers of the Monopolies and Restrictive Practices Commission, Mr. A. G. Bottomley stated that before considering any changes it was proposed to await the reports on its first investigations. There was no reason to doubt that the commission's existing powers were sufficient to enable it to obtain all the information required.

TO overcome the shortage of factory inspectors, two open competitions will be held this year and the age for recruiting is being lowered from 23 to 21 so that younger graduates can become candidates —Mr. George Isaacs.

IN reply to a question from Mr. J. Grimston, concerning the number of staff in the Scientific Adviser's Division of the Ministry of Food, Mr. Maurice Webb said that the total was 58 compared with 16 five years ago. The figures, however, were not strictly comparable as much of the work now being done under the direction of the Chief Scientific Adviser, was in 1945 being carried out in other divisions of the Ministry.

ASSURANCES that the minute quantity of iodine proposed to be used in salt would not have any adverse affects even to persons allergic to iodine were given by the Minister of Health in reply to questions from Sir Hugh Lucas-Tooth and Mr. Langford-Holt.

REPLYING to a question by Mr. John Grimston about the importation of streptomycin, the Minister of Health stated that no licences were being issued as British supplies were adequate for all home requirements and there was a margin for export.

MR. A. R. HURD asked the Minister of Agriculture if the expected supplies of artificial fertilisers, particularly of potash, were being received from Palestine, Germany, and France. Mr. G. Brown said that favourable weather had created a brisk demand, but expected supplies were being received and were larger than last season. Had the farmers taken heed of the advice to take early delivery of potash, the present shortage would probably not have arisen.

Chemical Engineering Study

WELCOME evidence of increased recognition of chemical engineering as a course of study for the B.Sc. and other degrees is contained in the current issue of the quarterly bulletin of the Institution of Chemical Engineers.

The University of London Inspector has approved the course of study at Bradford Technical College in chemical engineering, leading to the external degree of London University in that subject, and has recommended that the college be recognised for the external degree of B.Sc. (Eng.) in chemical engineering.

Arrangements to include chemical engineering in the endorsement of National Certificates in chemistry and applied chemistry have been made as a result of negotiations between the Institution, the Ministry of Education, and the RIC.

The Principal of the Municipal College at Burnley wishes to develop a preliminary course in chemical engineering.

Freedom for Steel Industry

U.S. Determination to Retain Independence

THE view that the British Government, through its control of certain materials, has strangled the growth of some industries and promoted others according to its political ideology, was offered recently as an indication of the dangers besetting American steel industry. It was the central theme of an address by Wilfred Sykes, chairman of the executive committee of the (U.S.) Inland Steel Company, published in *Midwest Engineer* (2, No. 7, 3-7).

Through controls, Mr. Sykes believes that the U.S. industry could become a political pawn, with its freedom to develop destroyed. Only degeneration could be the result. The existence of Government-subsidised plants, with low overheads and no responsibility to make profits to attract capital investment, would be disastrous.

Forcing Nationalisation

The building of plants with Government funds and the arbitrary fixing of prices would destroy private enterprise and eventually strangle it, leaving the owners no alternative but to liquidate or sell to the Government. This would bring about nationalisation.

Citing the competitive spirit of free enterprise in the U.S. industry, which has required that every company should take advantage of new developments, this, claims Mr. Sykes, has lowered production costs, improved quality and increased output.

Some American politicians had thought that non-competitive methods, or an approach to the cartel system, would better achieve stability and prosperity. The attempt to establish such a system in 1934 had been a miserable failure.

As a result of the rapid expansion and development under a free competitive system, people from all over the world were going to the U.S.A. to purchase equipment and study production methods and, where possible, to acquire the "know how" developed there.

The rehabilitation of the steel industry in Western Europe was dependent almost entirely on U.S. equipment and knowledge.

The U.S. industry, said Mr. Sykes, produced about one-half of the world's steel and had reached a capacity of 100 million tons of ingots annually. It was estimated that in 1950 the steel industry would spend about $500 million provided from its own resources.

There had been some rather ill-founded speculation on the future of the steel industry, and it was suggested that the sources of domestic ores were being depleted so rapidly that large imports of foreign ores would soon be needed.

This, Mr. Sykes said, was not a true picture: the nation's resources were not sufficiently reduced to cause immediate concern. Improvements in the equipment and methods of removing the overburden from the ore body had allowed many properties, previously considered as underground mines, to be exploited by open pit operations.

About 85 per cent of the U.S.A.'s ore requirement was obtained at present from the Messaba Range. Extraction of ores there had been largely compensated by the discovery of new ore and the reclassification as ore of material previously considered to be of too low a grade.

The best estimates available showed that the U.S.A. would have a supply in the Messaba Range that would last about 30 years, after which the annual production would gradually decrease.

There were many other districts remaining to be exploited. It would seem that there was ample ore in sight to enable the steel industry to operate for, probably, hundreds of years, without dislocation.

Changing Metal Prices

THE price of zinc was increased on April 4 by £2 per ton delivered. Good ordinary brand zinc became £91 10s. per ton, and prices of other grades were varied accordingly. The zinc oxide manufacturers also announced that from the same date the prices of zinc oxide, in lots of not less than two tons, delivered, were increased by £1 15s. per ton. Red seal becomes £87 10s. per ton; green seal £89, and white seal £90.

The additional charges made on orders placed with the Director of Non-Ferrous Metals for forward delivery of copper, lead and zinc have, as from April 4, been reduced as follows:—

Second and third calendar months after month of order: Copper per ton £1 10s. (previously £2 10s.); lead per ton £1 (£2); zinc per ton £1 (£2). Fourth, fifth and sixth calendar months after month of order: Copper per ton £3 (previously £5); lead per ton £2 (£4); zinc per ton £2 (£4).

New Acetylating Agent

Useful Potentialities of Isopropenyl Acetate

ISOPROPENYL acetate is a new chemical of great potential value in a number of syntheses. Characteristic examples are acetylation, in which the mild and easily controlled conditions associated with this reaction recommend the reagent's use with many compounds otherwise difficult to acetylate; reaction with alcohols and amines to form new esters or amides; reaction with acids to produce anhydrides of unsaturated and aromatic acids and polymerisation to form either low molecular weight, viscous liquids or when co-polymerised with other monomeric compounds, solid polymers.

The acetate is prepared commercially by the reaction of ketone with acetone in the presence of an acid catalyst. This reaction is reversible and the original components may be readily obtained under the influence of heat and a suitable catalyst.

Source of Monomers

Isopropenyl acetate is a water-white liquid, specific gravity 0.9202 and boiling point (748 mm.) 96.6° C. Flash point is 14.5° C. (58.1° F.). Normally the commercial grade, as manufactured in America, has an ester content of approximately 98-100 per cent.

The most valuable property of this new industrial chemical is its ability to act as acetylating agent. Thus, from acetaldehyde and paraldehyde it is possible to prepare vinyl acetate; from crotonaldehyde, 1-acetoxy-1, 3-butadiene; from ethacrolein the monomeric substance 1-acetoxyisoprene and from acetophenone, a-acetoxystyrene. These are all polymerisable monomers which may be converted into commercially useful polymers.

Isopropenyl acetate is particularly useful in the acetylation of compounds such as hydroxy esters and nitriles, tentiary alcohols and other molecules which have a tendency to dehydrate in the presence of acetic anhydride. Suitable esterification catalysts include sulphuric acid and p-toluene sulphuric acid (0.1-0.5 per cent).

Interesting isopropenyl esters can be obtained when the acetate reacts with carboxylic acids in the presence of ester interchange catalysts such as mixtures of mercuric acetate and boron trifluoride ether complexes. Halogenation is carried out quite readily and compounds such as a. β-dihalopropyl acetates can be formed provided the reaction is carried out at reduced temperatures, preferably 0° C.

The polymerisation of isopropenyl acetate may be considered under three main headings.

First in the presence of peroxide catalysts, such as benzoyl peroxide, isopropenyl acetate can be polymerised to form low molecular weight, viscous liquids.

Secondly, when copolymerised with other vinyl compounds, e.g., vinyl chloride, isopropenyl acetate will form solid copolymers which are of interest for making films and synthetic fibres. The copolymer formed from vinyl chloride and isopropenyl acetate so as to contain up to 32 per cent of the acetate is one of the most useful of the new copolymers.

Finally, copolymers may be formed by reacting isopropenyl acetate with esters of maleic and fumaric acids to yield clear, colourless resins, some of which are suitable for making cast sheeting of excellent optical properties. From these copolymers it is also possible to make bead compounds suitable for moulding.

Mixed Vegetable Oil Imports

THE Ministry of Food, in consultation with the Board of Trade, has drawn attention to the fact that while imports of certain vegetable oils, including teaseed oil, are at present admitted under open general licence from selected countries, there have been recent instances of imports of oil described as " teaseed oil " which on analysis has been found to contain an admixture of other oils, such as groundnut oil, coconut oil, palm oil, or palm kernel oil. Such mixtures are not covered by the open general licence and are subject to restrictions on sale under the Oils and Fats (No. 2) Order, 1949.

Hitherto the Ministry of Food has given authority for shipments of mixed oil imported in good faith as teaseed oil to be disposed of through ordinary commercial channels. The Ministry now announces that such authority will not be granted for any future imports and that arrangements are being made to verify that goods entered as teaseed oil fully conform to that description.

MONOMERIC ACRYLIC ESTERS

Their Use in Leather Processing and Finishing

THERE are now several monomeric esters of acrylic and methacrylic acids available in commercial quantities, the most important being methyl acrylate, ethyl acrylate *n*-butyl acrylate, methyl methacrylate and *n*-butyl methacrylate. These are becoming of interest to the tanner as filling agents and for the primary or bottom finishing of upper leather, bag leather and upholstery.

There are many advantages offered by these acrylic esters over other monomeric compounds, notably those based on urea, melamine, phenol, resorcinol, etc. For example, the monomers are colourless liquids, capable of being polymerised into clear resins. They can be polymerised without diluents or with diluents in a homogeneous system. In addition, polymerisation may be carried out in a heterogeneous system, or by emulsion and suspension polymerisation.

Co-Polymers

Types and conditions of polymerisation influence the properties of the polymer; for example, polyethyl acrylate can vary in molecular weight from 2200 to a weight that is too high to determine. Apart from the straight polymeric esters, a large number of co-polymers can be prepared. The monomeric esters are convenient to handle and may be obtained as inhibited liquids which, on using excess catalyst , can be converted into polymers.

Polymerisation takes place very rapidly in the presence of catalysts, such as benzoyl peroxide, ultra-violet light and heat. Above 5°C. the monomers soon begin to polymerise in ordinary daylight. The esters are soluble in a wide range of solvents, including benzene, butyl acrylate, methanol, dioxane, acetone, ethylene dichloride, toluene, etc., solubilities varying from ester to ester.

There are, of course, certain disadvantages attached to the application of esters, and these should be known by the tanner.

They are expensive when compared with most other monomeric substances. They have low flash and fire points and are highly inflammable, so that the use of adequate ventilation and the elimination of open flames, static electricity, and other possible sources of sparks or flames is essential.

The esters are toxic and need to be handled with care, although the polymers themselves are quite innocuous. They possess a sweet, sickly, but not unpleasant smell.

The esters are of main interest to the tanner on account of their ability to be changed into polymers, many of which are tough and elastic compounds. Extra weight can be given to several types of leather; water resistance may be improved and broken grain or disfigured surfaces masked by a layer of the polymerised resin.

So far, little commercial use has been found for the acrylic monomers, but even a casual consideration of their potentialities will indicate that they have a wide field of usefulness, both in the processing of leather prior to finishing and in the actual finishing operation.

One method which is suggested for treating chrome goods is to drum the dyed and dried stock in an emulsion of ethyl acrylate containing 5 per cent of the ester, using the minimum quantity of liquid. After 10 minutes' processing the leather should have absorbed all the monomer and the skins can then be taken out, horsed up for 12 hours and then dried.

Generally, polymerisation is fully completed during drying which, for chrome leather, can be carried out at advanced temperatures. Ethyl acrylate is suggested because it gives a tough and fairly elastic polymer, but there are, of course, several other esters, including some which are only available in experimental quantities, *e.g.*, cyclohexyl acrylate, isobutyl acrylate, etc.

The Stuffing Process

Some interesting results can be obtained by adding acrylic esters to the oleaginous mixtures used for stuffing chrome kips and hides. The addition of 2-5 per cent of monomer on the weight of the dry leather will make possible a worthwhile increase in resistance of the finished leather to the penetration of water, and also an increase in weight.

The monomeric esters can be sprayed on to the dry leather prior to finishing, and this practice offers some advantages over the more usual method of spraying with solvent solutions of the polymers. Greater penetration of monomer can be effected, which is important where the grain is damaged and there is a need to provide a really tenacious bottom or primary finish.

SCOPE OF THE NEW DETERGENTS

Surface-Active Agents and Germicides

by NORMAN J. HARPER, M.Sc., A.R.I.C., Ph.C. (N. Ireland)*

SURFACE-ACTIVE agents are, as a rule, characterised by a molecular structure which is essentially linear. The most important feature is the large hydrophobic or non-polar group in the molecule, usually in the form of a long hydrocarbon chain, but sometimes as a hydrocarbon ring or system of rings, and attached to this a hydrophilic or polar group, such as a carboxylate, hydroxyl, sulphonate, or sulphuric ester group which confers water solubility on the compound. If the soluble group in detergents is towards the end of the hydrophobic group the product acts best.

Molecular Behaviour

Soaps are the simplest examples of surface-active agents, employing the principles exemplified by sodium stearate $C_{17}H_{35}COONa$. The hdrocarbon chain ($C_{17}H_{35}$) represents the hydrophobic part, and the (COONa) the hydrophilic portion of the molecule.

Molecules of this type orient themselves at the surface of the solution and also at the interphase between a soap solution and an immiscible liquid. The soluble water-attracting group stays in the water surface while the hydrocarbon chain tries to move out of the water surface and into the oil or other immiscible liquid. This results in a reduction of surface tension in the first instance, and a reduction of inter-facial tension in the second.

Another important property associated with surface-active agents is the effect of solubilisation, or the carrying of normally insoluble substances into thermodynamically stable solution. This is dependent upon the presence of colloidal micelles in the interior of the solution and is essentially a bulk property of the solution system, whereas the alteration of surface tension is fundamentally a surface property.

Surface-active agents are noteworthy for typical effects, usually called gross effects, which cannot readily be measured or expressed in terms of basic physical units. Such effects are: wetting, foaming, deflocculation or dispersion, emulsification and detergency.

The electrical charge on the hydrophobic group serves as a convenient basis for the classification of detergents; on the nature of this charge, or the absence of ionisation, detergents have been classified as: anionic, cationic, and non-ionic.

If the long hydrocarbon chain or hydrophobic portion of the molecule is included in the anion in aqueous solution, the substance is called anion-active or anionic, for example, sodium stearate:

$$C_{17}H_{35}COONa \rightleftharpoons C_{17}H_{35}COO^- + Na^+$$

In the cationic or cation-active type, the cation contains the hydrophobic portion of the molecule, for example, cetylpyridinium chloride.

$$(C_{16}H_{33}N:CHCH:CH)Cl$$
$$CH:CH$$

The fatty esters of glycol and glycerol $C_{17}H_{35}COO—CH_2$, $HO—CH$, $HO—CH_2$ were the earliest non-ionic surface-active agents, for example, glycerol mono-oleate. More soluble non-ionic esters and ethers were obtained by condensing polymerised ethylene oxide with fatty alcohols or with substituted phenols.

The remarkable growth in the use of synthetic surface-active agents, including detergents, wetting agents, and emulsifying agents, can be best illustrated by the production figures in America, where production jumped from 6000 tons in 1941 to 200,000 tons in 1947; the estimated production for 1950 is some 500,000 tons. Textiles, engineering, food, leather, paper, paint, and brewing are a few of the other industries in which these compounds are used.

Clinical Value

Many of the pharmaceutical applications of detergents depend upon germicidal effect. This naturally varies from product to product, and seems to have only a limited relationship to the usual surface-active and gross properties. Detergents may be used themselves as germicides, or they may be employed as solubilising, emulsifying, or carrying media, for other germicidal compounds. For the last purpose, the detergent may be inert, or it may act as a synergist for the active ingredient, by increasing its germ-killing activity.

In some combinations the surface-active agent may reduce the potency of the active agent and these, of course, should be avoided; for example, an anionic detergent should never be used in combination with a cationic germicide.

* Condensed from a paper presented before the Pharmaceutical Society in Edinburgh on March 15.

Micro-organisms vary greatly in their resistance to the surface-active agents, and it has been shown that the established methods of testing non-surface active germicides do not always give accurate results when applied to the surface-active compounds. For this reason the broad claims of the germicidal activity made for some of these compounds must be carefully checked. The evaluation of surface-active germicides is still a very controversial topic.

Of those detergents which are in themselves destructive to micro-organisms, the most potent are the cationic, more particularly the quarternary ammonium compounds. Their high potency and usefulness was first pointed out by Domagk in 1925. Since then hundreds of new "quats" have been synthesised and their use as germicides or fungicides disclosed.

Among those which have been most widely accepted are the alkylpyridinium halides and the alkyltrimethylammonium halides, in both of which the cetyl radical is said to give optimum results. Domagk found that excellent results were obtained when a wide variety of hydrophobic groups were combined with the dimethylbenzyl ammonium group; the presence of this characterises several other successful and widely used compounds.

Within limited series of the "quats", many attempts have been made to correlate chemical structure and detergency and other surface effects with germicidal activity. None, however, has as yet brought forth any correlation of wide scope.

Antibacterial Effects

The "quats" meet many of the requirements of the ideal disinfectant. Most of them, marketed as germicides, sanitisers, or disinfectants, are relatively free of colour, and are odourless and tasteless in the dilutions normally employed. They are soluble in water and in a variety of organic solvents, and, as a rule, are relatively non-corrosive. As a group they are active in rather high dilution, exhibiting a high antibacterial power against both gram-positive and gram-negative organisms.

Laboratory results have shown that CTAB in 0.03 per cent concentration is sufficient to kill rapidly virulent strains of *Staphyloccocus aureus* and *Streptoccocus pyogenes* in the absence of organic matter. *Bact. coli* and *Ps. pyocyanea* organisms are also quickly killed under the same conditions. All are susceptible to a 0.1 per cent solution, even in the presence of moderate amounts of organic matter. Bacterial spores are more resistant.

Factors which influence germicidal activity are *p*H, temperature, concentration, and the presence of organic matter. The "quats" are considerably more active in neutral, especially alkaline solution, than in acid solution. Mueller and Baker stated that the effectiveness of the cationic compounds increased progressively as the *p*H shifted towards the alkaline side of neutrality—this is in contrast to the anionic compounds which show their maximum activity on the acid side. It has been shown, however, by Quisno and Foter that cetylpyridinium chloride is exceptional in that its maximum activity is shown in acid solution.

Toxicity

In the concentrations used, the "quats" are, generally, considered to be non-toxic. They do not interfere with the healing processes, nor do they cause irritation. In a very small number of cases, sensitivity to some of these compounds has been reported. Reports are now becoming available on the use of these compounds in medicine over prolonged periods.

Wright *et al.* described the use of an alkyldimethylbenzyl ammonium type in connection with amputations, abdominal and other surgical conditions, and burns. The substance was found to be without toxic effect when used on large denuded surfaces, nor did it cause discomfort to the patients. Clarke used patch and scratch tests on 600 patients with a 1-200 tincture and aqueous solution of cetylpyridinium chloride. There were no reactions.

In medicine, the main use of these compounds has been the sterilisation of surgeons' hands in gloveless surgery, in obstetrics, in securing a sterile operative field. They have also proved useful in wound and burn therapy.

Their combined detergent and bactericidal properties make them particularly useful for the routine cleaning of hospital equipment—in all those cases where it is desirable to cut down the risk of cross-infection. To obtain the desired detergent effect more concentrated solutions have to be used.

The choice of preservatives in pharmaceutical preparations is frequently a problem and it is possible that the answer may be the "quats". Their possible use has been investigated by determining their minimal effective concentration to prevent growth in different proportions of gelatin and sucrose. Although inconsistencies in the results have prevented definite conclusions from being made, it is considered that those obtained merit further investigations.

Although the cationic agents received

much wider acclaim, there are also effective germicides among the various classes of anionic detergents. The fatty alkyl sulphates have been most widely studied, and the straight chain compounds of C_{12}—C_{18} have been found to be effective against gram-positive bacteria, but much less so against gram-negative types.

Sodium lauryl sulphate has been suggested as a basis for disinfectants. Some secondary alkyl sulphates are said to possess excellent bactericidal powers, as do also the long chain alkyl aromatic sulphonates.

Use in Cosmetics

Non-emulsified lotions often contain detergents such as sodium lauryl sulphate or triethanolamine to facilitate their spreading on the skin. Lotions containing solid materials in suspension, such as calamine or sulphur, often contain a detergent to help in maintaining the suspension.

The shampoo preparations form one of the main outlets for synthetic detergents, in spite of the fact that the soap type of shampoo is still the most widely used. One of the main disadvantages of the soap shampoo is the lack of resistance to hard water.

The shampoos formulated with synthetic detergents are of two main types—foamless and foaming; the latter is by far the more important. The foamless type is, essentially, a low-sulphonated vegetable oil, usually prepared from castor oil or oils containing oleic glycerides.

Many synthetic detergents have been suggested and used as foaming shampoos, but relatively few have attained a high degree of "acceptancy". To be successful they had to have good solubility, had to produce the desired type of foam, and had to be free of " harshening " or irritating effects.

There has been considerable controversy over the harmful effects of soap on the skin, and, although in the majority of cases, no sensitivity occurs, it is evident that the relatively high *p*H does bring this about in certain cases, in which, detergents such as sulphonated oils, sulphated higher fatty alcohols, have been successfully used as personal cleaners.

Detergents have been added to soap to improve its efficiency. Development in this direction was stimulated by the war, when it became necessary to supply the Armed Forces with large quantities of personal cleaners which could be used with salt or hard water. In America and in the U.K. large quantities of detergents were used for compounding with fatty-acid soaps to produce the so-called "general purpose soap", of which, in the U.K. alone, 48 million bars were prepared and supplied to the Forces.

U.S. Engineers to Review New Processing Factors

TWO relatively new engineering processes will be the subjects of symposia to be presented at the Boston regional meeting of the American Institute of Chemical Engineers, at Swampscott, Massachusetts, from May 28-31.

The symposium on ultrasonics, under the supervision of Prof. Dudley Thompson, Virginia Polytechnic Institute, will explore the potentialities and limitations of this comparatively new tool of science.

Papers will deal with fundamental principles of ultrasonics; chemical, physical, and colloidal effects produced by ultrasonics; and the industrial utilisation of ultrasonic energy. The use of ultrasonics in the study of matter and as a method of material testing will also be considered.

Prof. E. R. Gilliland, of Massachusetts Institute of Technology, will preside at the symposium on fluidisation, the purpose of which is to emphasise the chemical reaction aspects of the fluidised powder process, rather than the physical characteristics of the operation. Papers will deal with diffusion rates in porous solids, principally catalyst materials; experimental results of the flow of gas and solid in a commercial catalytic cracking unit; and the mechanism of reaction in fluidised powder systems.

There will also be a general technical session in which will be considered the extraction of cobaltous chloride in capryl alcohol spray towers, and a study of an ion-exchange system. The U.S. potash industry will be discussed.

Problems of engineering design will be discussed in papers describing a continuous, small-scale plant for the study of catalytic reactions at high pressure and temperature, a new graphical technique for PVT correlation, and an analysis of the treatment of temperature differences in split-flow heat exchangers.

The education of chemical engineers for industry is to be discussed by Prof. W. G. Whitman, of M.I.T.

THE ALKALINE EARTH PLUMBATES

Their Potential Use as Anti-Corrosion Paint Pigments

THE majority of the less soluble compounds of lead have at some time been used as pigments. In addition to the classical white and red lead, the sulphates, chlorides, fluorides, chromates, antimonates, silicates and other compounds have all proved their value in paint. Although the plumbates of the alkaline earth metals are lead compounds, their chemical composition makes them different from other lead pigments.

The importance of the alkaline earth plumbates as paint pigments to assist in the conservation of a valuable and still comparatively costly raw material—lead—is stressed by Mr. N. J. Read (Goodlass Wall and Lead Industries, Ltd.) in this paper. It was one of those recently presented before the London section of the Oil and Colour Chemists' Association

In the common lead pigments the cation consists entirely of lead, whereas in the alkaline earth plumbates the lead is found only in the anion. Experiments appear to show that the presence of alkaline earths as cations in compounds of the plumbate type opens up a new field of investigation in paints for the protection of iron and steel.

When the necessity for economy in the use of lead became obvious, an investigation was commenced with the object of developing a rust inhibitive pigment which would economise lead and give protection similar to that afforded by red lead.

The similarity between the chemical structure of red lead or lead ortho-plumbate and the plumbates of the alkaline earths is immediately noticeable from their chemical formulæ—respectively red lead $2\ PbO\ PbO_2$, and alkaline earth plumbate $2\ RO\ PbO_2$. Having in mind the rust inhibitive effect of red lead and the believed relationship of its basicity to inhibitive power, it is thought that the greater basicity of the alkaline earth compounds may provide anodic inhibition even superior to that of red lead.

It has been shown that the type of inhibition conferred by the alkaline earth plumbates is not solely anodic, but also cathodic, and in that characteristic they differ from other rust inhibitive pigments. The only alkaline earth plumbates of pigmentary interest are the anhydrous compounds prepared by heating mixtures of lead monoxide and alkaline earth oxides or carbonates under controlled conditions in air.

A number of hydrated plumbates have been studied, but those compounds have no pigmentary value, being too reactive with oil vehicles for use in paints, and having other disadvantages.

The Ortho-Plumbates

The alkaline earth ortho-plumbates were studied by Kassner between 1894 and 1898. He has described a method of preparation and some of their properties and has obtained patents for their use as sources of oxygen, in match making and in glass manufacture, etc. Since the publication of Kassner's work, however, the ortho-plumbates do not appear to have attracted further attention, and hitherto no attempt has been made to utilise them as paint pigments.

In a recent series of experiments in which intimate mixtures of litharge, and respectively lime and strontium and barium carbonates, in proportions of one molecular equivalent of lead oxide to two molecular equivalents of the base, were heated under controlled conditions, the rate of oxidation was followed by determination of the lead peroxide contents at intervals.

It was found that the temperature range given by Kassner, of 600-1000°C., was appropriate to all the mixtures, but at 600°C. the interaction was very slow after a certain proportion of plumbate had been formed. The oxidation curves were of the same type as were obtained in red lead preparation, but the decomposition temperatures of the alkaline earth plumbates being further removed from the formation temperature than was the case with red lead, there was little danger of operating at too high a temperature.

Low Temperature Operation

On the other hand, for manufacturing convenience, and also in order to produce as soft a powder as possible, it is desirable to operate at as low a temperature as is practicable.

For calcium plumbate the optimum temperature is about 700°C. Strontium and barium plumbates require rather higher

temperatures. For barium plumbate the temperature is of the order of 800°C. In the case of calcium plumbate it is found that 1-ton charges in a works furnace oxidise at the same rate as the small laboratory charges. The avidity with which the lime/lead oxide mixtures absorb oxygen at 700°C. is remarkable.

The brown and black colours of the strontium and barium plumbates call for no further comment, but the colour of the calcium compound has been found to be variable at will.

Colour of Calcium Compounds

Apart from the effect of impurities in commercial lime, which impart a creamy tint to the lightest form, it may vary from white to dark reddish buff, depending on very small variations in the proportions of lime and lead oxide used in the mixtures from which it is prepared. Those variations in colour could not be imitated by mechanical mixtures of litharge and calcium plumbate; it seems reasonable to assume therefore that any excess of lead is in the chemical combination of the plumbate, conceivably as lead calcium plumbate, which is said to be red brown.

If a chemically pure source of calcium oxide, such as precipitated calcium carbonate, is used in slight excess in the preparation of calcium plumbate, a white product is obtainable. Alternatively, the addition of a small amount of ground quartz instead of the use of an excess of calcium carbonate also produces a white plumbate; probably the silica preferentially combines with any surplus lead oxide. The PbO_2 contents of those white products indicate that they were at least 99 per cent $Ca_2\ PbO_4$.

Preliminary experiments show that all the plumbates described have possibilities as paint pigments. They are substantially insoluble in water and easily dispersed in oil vehicles to form stable paints of high opacity.

Calcium Plumbate

Calcium plumbate has an attractive appearance and requires little, if any, grinding after furnacing, and although the lead content is higher than that of either strontium or barium plumbate, it has a lower specific gravity, and the lead used in paint formulations is no higher.

The BSI test is not applicable to calcium plumbate, and *p*H determinations on the aqueous extract are without the usual significance.

On extraction with cold water it yields about 0.5 per cent of soluble matter, essentially calcium hydroxide. Dry paint extracted with water by a method described by Cushman and Gardner yielded 0.1-0.2 per cent of soluble matter per 100 gr. of pigment present in the paint. That small but continuous supply of alkaline water-soluble material at the iron/paint interface has no deleterious effect on the paint film; indeed, to it is attributed to a significant degree the high rust inhibitive power of calcium plumbate paint.

There are some unusual features in the behaviour of calcium plumbate as a rust inhibitor which indicate that it functions differently from the rust inhibitive pigments in common use. If the assumption that calcium plumbate is a general inhibitor for anodic and cathodic areas is correct, it follows that a paint containing this should exhibit resistance to blistering on immersion in sea water, absence of pitting, and resistance to creep of rust under the film when abrasions exposed the metal and formed accidental anodes.

Exposure trials of calcium plumbate paint have shown that it exhibited all the properties which might be forecast from its assumed electrochemical behaviour. Those properties, however, form only part of the requirements of a paint pigment.

Sea Water Immersion Tests

The chlorinated rubber paints in salt water immersion tests show a colour change of the pigment, but the protection afforded is good. It has been found that the best inhibitive effects of calcium plumbate are obtained in sea water immersion in simple linseed oil or polymerised vegetable oil vehicles.

With the more complex vehicles, in certain conditions the inhibiting agent does not appear to reach the metal/paint interface in sufficient concentration, and blistering is not prevented to the maximum extent, although rusting is not markedly increased. Similar observations have been recorded by other workers in the case of red lead paints.

Due to the powerful rust inhibitive effect of calcium plumbate and the toughening influence it exerts on the paint film, paints of high protective value can be formulated with large amounts of inert extenders. In fact, over rusty iron even better results have been obtained in sea water immersion tests with paints in which the pigment has been extended with 50 per cent of barytes and asbestine than with the unextended pigment.

The light colour of calcium plumbate permits its use in a variety of tinted paints. Grey, green and brown paints have been prepared. Experience has not

shown that the basic character of the pigment effects the colour of some of the alkali-sensitive pigments. Very light tints of Prussian blue, both in mixture with calcium plumbate and painted over calcium plumbate, have withstood long exposure in a C.C.I. humidity cabinet without marked change in colour. A few exposure trials on timber have been made, with very promising results.

The use of calcium plumbate paint on galvanised iron indicates that it can be used direct on new galvanised iron which has not been previously treated, and that it does not crack or flake.

Opening the discussion which followed, the chairman, Mr. H. A. Newnham, commented that his first impression on hearing the paper was that the sale of red lead and zinc chrome would cease, that with the barium and strontium and calcium plumbates we should be able to make red, black and white paints, and the whole trade would have a difficult time in competing. One felt that there must be some limitations to the materials, although it seemed from the paper that they possessed most of the properties required in pigments for primers and finishing paints.

Novel Pigments

Mr. Read said he hoped he had not given the impression that calcium plumbate paint was super-perfect. No doubt all sorts of disadvantages would crop up; but the pigments were novel, because possibly the effect of calcium and lead soaps in combination had not hitherto been investigated.

Among those who joined in the discussion, Mr. L. A. Ravald (North Thames Gas Board) said that his research department was introduced to calcium plumbate by Mr. Read's organisation about 18 months ago, at a time when they were investigating the blistering and detachment of films of finished paints of three-coat systems, on immersion in water. The paints forming those films had been applied to the steel side-sheeting of water-sealed telescopic gasholders, and in no case was the underlying red lead primer involved. Although their difficulties had occurred with paint systems applied to steel, the defects were not considered to be due to rusting or to the nature of the surface, but to other causes unknown.

Mr. Ravald showed by a photograph an example of the type of blistering experienced, blisters formed in paint systems applied to ground glass test plates on water immersion. Incidentally, the same result had been produced on Perspex and Monel plates. The paint systems were normal three-coat ones, *viz.*, red lead to B.S.S. 1011, with second and third coats based on linseed oil, with or without a small addition of varnish. The blisters were of varying sizes, and the larger blisters formed between the red lead primer and the second coat.

On one plate, said Mr. Ravald, there were, even on the larger blisters, small upstanding blisters which had formed later between the second and finishing coats. In all cases the red lead was unaffected. All the blisters were filled with water. Possibly the suggestion made by Dr. Rains during the discussion at the Rothesay conference of OCCA last year, of the expansion of the film by the action of water, was a feasible explanation.

Absence of Blistering

Mr. Ravald next showed a photograph of the effect of using calcium plumbate paint as the second coat; there was almost complete absence of blistering. He said he would be glad of an explanation of the interesting and important suppression of the blistering tendency by calcium plumbate paint. That suppression had so far not been obtained by other undercoats.

Mr. N. A. Bennett suggested that probably the particle size of calcium plumbate pigments was very much larger than in red lead; and he added that no reference had been made to particle shape. All the tests referred to in the paper were made on nicely abraded steel panels, and perhaps because of the relatively large size of the particles, and on account of their shape, if tests were made on surfaces such as those to which primers, and so on, were usually applied, relatively poor results would be obtained.

Mr. Read replied that the particle size was not very different from that of the average non-setting red lead, except for the coarse aggregates at the bottom. There was no definite crystal shape; the shape was much the same as in non-setting red lead. As to the condition of the surfaces to which the paints were applied, he said that not very many large scale tests had been made yet, but there were some outside tests which backed up the accelerated tests he had mentioned.

Mr. Neil R. Fisk recalled that from time to time one had heard the forecast that linseed oil was on the way out and that the future was with derivatives and compounds. It was interesting, therefore, to hear from Mr. Read that the best results with calcium plumbate in sea-water exposure were obtained when using the simple linseed oil vehicles.

OVERSEAS CHEMISTRY AND INDUSTRY

Progress of India's Fertiliser Plant

Co-operative Enterprise Speeds Work at Sindri

PILOT-SCALE production at the Sindri fertiliser factory, in Bihar, India, is expected to begin by the end of this year and full production should be reached during 1951. The factory will manufacture 1000 tons of ammonium sulphate per day.

Sindri is within easy reach of coal and coke quarries and water from the Damodar river. It is connected with India's main railway system.

The broad planning of the project was undertaken by India's Ministry of Industry and Supply. After preliminary exploration, a contract was signed in February, 1946, with an American firm, the Chemical Construction Corporation, for the design and fabrication of the plant and other services and with the (U.K.) Power Gas Corporation, which was entrusted with the purchase of the plant and the provision of building services.

The factory is divided into four main groups: power house, gas plant, ammonia synthesis, and sulphate plant. As a by-product, approximately 1000 tons of lime slurry will be produced per day.

Plans are in hand for the installation of a cement works to manufacture Portland cement, some 300 tons daily, using the by-product lime slurry as the main raw material.

Fifteen thousand tons of structural steelwork was required, and this, as well as a large quantity of low pressure plant, has been fabricated from home produced steel.

Orders for plant, ranging from the power house to all the intricate plant for gas production, gas compression, ammonia synthesis and sulphate production, were placed in the United Kingdom and the U.S.A.

An indication of the potential value of the scheme to India's agricultural industries is given by the following data, which show clearly the large proportions of the installations: Capacity of the power house, 80,000 kW; electric power cables in the factory, 170 miles; pipe lines, 80 miles; consumption or water, 12 million gal. per day; railway track on the site, 12 miles; raw materials handled per day, coal 1200 tons, coke 600 tons, gypsum 1800 tons.

The implementation of the project is considered an outstanding example of international team work. American designers and United Kingdom constructional engineers have co-operated in securing the early completion of the factory and, to build up the operational team, specially selected Indian mechanical, electrical and chemical engineers were sent for training to the United Kingdom and the U.S.A. The latter, now returned, are enriching the knowledge they gained abroad by practical experience.

Indian Industries Seeking Materials and Equipment

THE trend of Indian policy for the development of native chemical industries was indicated at a recent meeting in Delhi of the Fiscal Commission at which evidence in support of further protection was given by the president of the Indian Chemical Manufacturers' Association.

In a technical and complicated industry like the chemical industry, tariff protection by itself, it was urged, would not ensure quick or efficient development. Positive measures like assistance in the supply of essential raw materials, import of essential apparatus and equipment and fostering markets abroad were needed. The recent export and import policy had considerably added to the difficulties of this industry, although in recent weeks some welcome relaxation in commercial policy had been noticeable.

Mr. C. P. Reddi, Industries Minister of Madras, told the Madras Legislative Assembly that the Madras Government had sanctioned the opening of a well-equipped chemical and analytical laboratory for testing the industrial potentialities of raw materials in the State. The Government was recruiting staff and intended to start the laboratory at an early date. The investigation for exploiting the rich lignite deposits in South Arcot would be hastened up this year. The question of appointing foreign experts trained in the extraction of lignite ores was under consideration.

Iron ores available in certain parts of the State like Salem and Sandur, had been sent to Norway for analysis, said the Minister. The possibility of starting a special steel alloy plant would be considered.

SCIENTIFIC RESEARCH IN BELGIUM

Effective Co-operation by Universities and Industry

COLLABORATION between a number of different interests to promote scientific research has achieved exceptionally successful results in Belgium. The means were reviewed recently at a meeting of the Société de Chime et Industrie (*Chimie et Industrie*, Feb., March; 176-181, 295-299) at which the inception of the programme in 1927, with the active support of King Albert, was recalled. Then, in less than three months, Fr.100 million was collected in response to an appeal by the universities of Brussels and Louvain, 25 per cent of the total having been contributed by the Solway organisation.

The FNRS (Fonds nat. de la Recherche scientifique) was established by Royal decree in June, 1928, and some details of the organisation and work of this body have been given in a paper by Professor Jean Baugniet, Rector of the Free University of Brussels.

On the governing council of the FNRS are represented the four universities, and heads of other educational establishments, such as the Royal Military School, the Hainault Polytechnic Faculty, the Agronomic Institutes of Gembloux and Ghent, the School of Veterinary Medicine.

Twenty-four Departments

Its principal function was to give financial support to scientists and research workers, students, and young people showing promise, and to provide books, equipment, opportunities for travel and so forth. The whole realm of science was classified into five main groups comprising in all 24 branches, each with its own committee.

Some attention has been given to nuclear research, and a special branch for nuclear physics was established in 1947, having facilities for work in university and other laboratories. This work has been on a relatively small scale, and progress has been handicapped by lack of suitable equipment and trained staff. It is hoped, however, to extend the work and make a worthwhile contribution to Western Europe achievements.

The Belgian Congo is included in the general scheme of research; for it is recognised that the great African territory offers wide scope in many fields for exploration and research. This is nowhere more clearly apprehended than in the Congo itself, and the Union minière du Haut-Katanga has made donations of Fr.10 million to each of the universities —Louvain and Brussels. It is suggested that such generous examples would be more frequent if leaders of industry could be relieved from the more onerous and restrictive forms of taxation.

In another paper Dr. Louis Henry, Director of the Inst. pour l'Encouragement de la Recherche scientifique dans l'Industrie et l'Agriculture, Brussels, established in 1944, gives an account of its functions and achievements in the applied sciences. Its main purpose is to finance research and to build up a competent staff of trained workers. So far Fr.40 million has been expended in financing various research programmes, including most branches of metallurgy, and special attention has been given to improved methods of manufacturing Thomas steel; soil and cultivation studies, and milk production.

Nationalising Indian Salt Industry

THE Government of Madras has declared that the salt industry in the State will continue to be a public utility service for a further six months from April 11. In September 1949 the salt industry in the State was declared a public utility service until April 10, 1950.

The nationalisation of the salt industry in the United States of Travancore and Cochin in South India, is under consideration by the State Government. In furtherance of the policy of nationalisation, the Government of Travancore and Cochin has issued an order taking over a salt factory in South Travancore.

An application has, however, been moved before the High Court for a writ of *certiorari* to cancel the notification and direct that the State Government should not take over the salt factories on the ground that the Act is *ultra vires* of the Indian Constitution.

Swiss Aluminium Company's Lower Profit

The board of the Aluminium-Industrie A.G. Chippis, the Swiss aluminium holding company with international ramifications, reports a net profit during 1949 of S.Fr. 7,106,482 (S.Fr. 7,596,109 in 1948). The dividend, of S.Fr. 60 per share, is unchanged.

OVERSEAS CHEMISTRY AND INDUSTRY

New Industries Planned for Ceylon

Latex Rubber, Soap Supplies and Paper Pulp

AN ambitious project for the development of the latex rubber industry in Ceylon is now under consideration. It could make a sevenfold increase in export figures. One reason for the slow progress of the industry has been lack of facilities for production and storage in bulk. Following the recent visit of Mr. F. D. Ascoli, a director of Dunlop's, to Ceylon, it is proposed by the company to establish a factory for the concentration of latex in Colombo, together with bulk storage installations. The scheme is estimated to provide for the handling of 200,000 gallons of latex monthly, equivalent to 6000 tons of rubber latex foam annually.

* * *

Hope of making Ceylon self-sufficient in the soap industry was brought a stage nearer by the recent opening in Negombo of a new factory. Mr. G. G. Ponnambalam, Minister of Industries and Industrial Research, said that the Government proposed to establish a number of similar factories. One problem at present confronting the industry was the supply of caustic soda, which had to be imported. Plans were, however, well advanced for the manufacture of this product in Ceylon in the near future.

* * *

Desiccated coconut has been in considerable demand not only in Australia and South Africa, but also in Europe and the United Kingdom, resulting in a release by the Government of a further 3500 tons for manufacture by millers. It is expected that free import will shortly be permitted to the U.K. Reduction in demand for white edible copra from Pakistan has resulted in a drop in prices. Production of white copra is restricted, and is made in specially installed kilns. Reports from some of the dry coastal areas, however, indicate that an almost equally good result can be achieved by sun drying.

* * *

A modern process of pulp manufacture, particularly suited for the exploitation of raw materials available in Ceylon, is to be adopted in the Government's new paper mill, which will be established in the neighbourhood of Batticaloa in Eastern Ceylon. This monosulphite process has already been successfully utilised in Turkey, Italy, France and Germany for a number of years. It is being progressively recognised in the U.S.A. and Canada, because it has been found to be particularly adapted for pulping agricultural residues. The process has also been independently investigated for the Ceylon Government by the Cellulose Development Corporation of England and by the Institute of Cellulose Chemistry at Darmstadt, Germany.

Australian Exploration for Pacific Oil Sources

IN a current review of Australia's search for oil, the director of the Bureau of Mineral Resources, Dr. Raggatt, states that at least £7.5 million has already been spent on exploratory work in Australia, Papua and New Guinea. An aggregate distance of about 87 miles has been drilled. Although no commercial producers have as yet been discovered, there appear to be grounds for hope that the search will not go unrewarded. Many of the 268 test wells drilled so far in Australia and the other territories have been reported as "not proved" rather than condemned.

Dr. Raggatt states that conditions on the mainland are less promising than those in Papua and New Guinea, but are good enough to warrant further investigation. He emphasises that one good discovery could make Australia self-sufficient in oil supplies for many years.

The Shell and Vacuum groups are engaged in the search, as well as an Australian firm, Oil Search, Ltd., the main work being in Papua and New Guinea, where £5 million had been spent up to the end of 1949.

The N.V. Nederlandsche Nieuw Guinea Petroleum Mij. (a member of the Royal-Dutch Shell group) first established commercial production in the Klamono region of Dutch New Guinea. The importance of Klamono is shown by the fact that out of 14 wells drilled, eight were producers. Annual output is now some 250,000 tons.

Technical Publications

THE full proceedings of the second conference on chemical works safety, held at Scarborough in October last (THE CHEMICAL AGE, 61, 523), have now been published in booklet form and are available, price 5s., from the Association of British Chemical Manufacturers.

* * *

CHEMISTRY of zinc is included among the abstracts of recent technical literature presented in the March issue of "ZDA Abstracts" (Volume 8, No. 3), obtainable from the Zinc Development Association, Oxford.

* * *

"THE Meaning of Research to American Industry" is the subject of an informative article by Raymond Stevens in the Spring number of *Progress*, published by Lever Brothers & Unilever, Ltd. This underlines the pre-eminent status of research in post-war America and shows how expenditure there has greatly increased sales. The development of the vast research programmes of some oil and chemical companies in the U.S.A. is illustrated by specific examples.

* * *

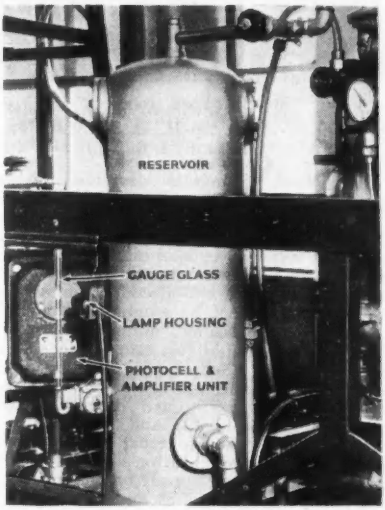
HINTS on the installation and maintenance of industrial electric motors and generators, with notes on their various applications, are given in a neat pocket-sized publication issued by Higgs Motors, Ltd., Witton, Birmingham. The booklet, price 1s. 6d., also contains many useful tables, including the general conversion of length, area, volume, weight, speed, etc., the physical properties of metals, and equivalent temperatures.

* * *

CHANGES in sulphite cellulose in respect of its hot alkali solubility and copper number during various bleaching processes are studied by Olof Samuelson and Curt Ramsel in *Svensk Pappers Tidning* (Swedish Paper Journal, No. 6), official organ of the Swedish Paper Mills Association, The Swedish Association of Paper and Cellulose Engineers, etc.

* * *

PROGRESS made in permanent magnet materials since the beginning of the century and reports of research carried out by the Permanent Magnet Association, Sheffield, are described by Alan Torry and Alun Edwards in an article "Developments in Modern Magnet Alloys" featured in "The Nickel Bulletin" (Volume 23, No. 3)—published by the Mond Nickel Co., Ltd.



[Courtesy, General Electric Co., Ltd., London

A recent application of photo-electric control is in the injection of lubricating oil into refrigerator compressor units. The Osram photocell equipment consists of a small lamp housing and optical system, a photocell amplifier and relay unit, with an arrangement for intercepting the light beam by means of a column of oil in a glass tube. When a refrigerator unit is filled, the oil level in the gauge glass falls, light falls on the photocell and the associated electrical equipment starts a pump to draw sufficient oil to fill the system.

NEW editions of its brochures on pure ephedrine products, heprona, benzevan and collumina are now available from Evans Medical Supplies, Ltd.

* * *

UNSTEADY heat conduction in plates, cylinders and spheres is dealt with in the "Sulzer Technical Review" (No. 3, 1949), published by Sulzer Bros. (London), Ltd. Many thermal problems which occur in different forms in technical work are discussed, such as problems of space heating and heat accumulation or the calculation of stresses in machine parts due to temperature variations in service.

THE CHEMICAL ANALYSIS OF FOODS. Fourth Edition, 1950. By H. E. Cox. London: J. & A. Churchill, Ltd. Pp. 340. 28s.

This book, which is described as a practical treatise on the examination of foodstuffs and the detection of adulterants, is devoted exclusively to the special methods required in food analysis. General procedure in organic analysis and theoretical principles, if not already familiar to the reader, have to be sought elsewhere.

Foods are classified under ten broad headings covering almost every conceivable type of food. Each of the corresponding chapters is in the nature of a separate monograph, wherein are described the methods of analysis and examination usually employed, together with short accounts of the preparation and properties of the foods as they appear on the market, and the likely impurities and adulterants.

In bringing the book up to date for the fourth edition, the author has deleted a number of methods that are not of contemporary interest, and has managed, without any appreciable increase in the size over the third edition (1946), to introduce a fair amount of new matter and references to recent papers. Included are determinations of various trace elements and vitamins, examination of baking powder, vinegars, soya meal, onions, meat extracts, sausages, tomatoes, ketchups, egg products, etc.

Recent work appears to have been well covered to about fifteen months ago, as a search by the reviewer for the presence of references to a number of important papers and reports of the previous two or three years was completely successful. In some cases, adequate details of procedure are given.

Descriptions of some of the methods could be improved. The passive and the imperative are used indiscriminately, and sometimes they appear close together, *e.g.*, determination of riboflavin in flour (p. 68), and determination of fluorine in wines (p. 184).

Since the demand on space does not permit other than literature references to many valuable methods, particularly those concerned with the use of physical instruments such as the Spekker, the book is not a complete manual on food analysis. It is, nevertheless, an excellent guide, and the chemist who is called upon to carry out such work can expect to find here, if not the full details of any particular method, at least the key to all the vital information.

COLLOID CHEMISTRY. H. B. Weiser. 2nd Edition. London: Chapman & Hall, Ltd. Pp. 444. 30s.

The purpose of the first edition of this book was to present to those who had had an elementary course in physical chemistry a more comprehensive treatment of the theory and application of colloidal behaviour. The present edition follows the same general plan and incorporates many of the advances which have been made in this field since the appearance of the first edition 10 years ago.

Among more important changes and additions is the up-to-date revision of the chapter on the mechanism of adsorption of Brunauer, Emmett and Teller's theory and gas vapour by solids and the inclusion of its application to the determination of surface area. Other new material is the method of surface area determination (Harkins and Jura) and the section on capillary condensation theory has been revised. In the chapters dealing with adsorption, that on wetting action has been rewritten and rearranged and a brief section on chromatographic analysis has been added. Although a section on applications of ion exchange is now included, no theory is given nor is mention made of the usefulness of ion exchange resins in the separation of inorganic ions, *e.g.*, the purification of the rare earths.

Mention is now made of Studinger's viscosity law method for the determination of molecular weight and the discussion on the applications of the ultracentrifuge to sedimentation and particle weights has been expanded. To the subject of stability of hydrophobic sols a fairly extensive addition has been made concerning the theory of the Dutch chemist Verwey, while the material on the flocculation of clays, formerly a separate chapter, is now dealt with here.

HOME

Rubber Research

What is stated to be the largest rubber research centre in the British Commonwealth will be opened at Fort Dunlop on June 7 by Sir Lawrence Bragg, Cavendish Professor of Experimental Physics, Cambridge.

BDA Fellowship

A sum of £1000 to endow a Research Fellowship to Bradford Technical College has been received from the Bradford Dyers' Association by the Bradford Further Education sub-committee. It is proposed by the donors that the Fellowship be tenable for two years at £500, and the subject should be in the fields of tinctorial or textile chemistry.

Drugs and Fine Chemicals

In an article dealing with antihistaminics (THE CHEMICAL AGE, *62*, 332), following the formulae for phenergan and chlorotrimeton, it was stated that "the pharmacological effectiveness of these drugs is approximately in the order: benadryl, pyribenzamine chlorotrimeton and phenergan." It has been pointed out that the drugs mentioned are arranged in ascending order of potency. (This series of articles has temporarily been interrupted by the indisposition of the author.)

Patents Fees

New fees for patents for inventions came into force on April 1, under the Patents and Registered Designs Appeal Tribunal Fees Order, 1950, as follows: £3 upon the filing of every notice of appeal to the Appeal Tribunal; £5 on the filing of every notice of appeal to the Court of Appeal from a decision of the Appeal Tribunal; and £2 on every order of the Court of Appeal made on any such appeal. In exceptional circumstances the fees may be remitted.

Four Killed by Ardeer Explosion

Four women workers were killed in an explosion in a cartridging house of the I.C.I., Ltd., explosives factory at Ardeer, Stevenston, Ayrshire, on April 4. They were working by themselves in a small cartridging department wrapping explosives when the explosion occurred. The Ardeer factory is one of the biggest explosives works in Europe. In reply to a question from Colonel Sir Charles MacAndrew in the House on Wednesday, April 5, the Secretry of State for the Home Department (Mr. Chuter Ede) stated that one of His Majesty's inspectors of explosives had been instructed to investigate the cause of the accident. The House expressed its sympathy with the relatives.

"Technical Backwardness"

Professor J. D. Bernal, addressing the third plenary session of the National Union of Student's congress at Brighton, last week, said: "Only about 10 per cent of Britain's scientists are concerned with inventions and the perfection of new processes. . . . What we don't realise is how far we are behind in both these fields. It is one of the principal factors in the technical backwardness of British industry."

Welding Research Prize

The British Welding Research Association announces that an award of £100 is again being offered for the best paper submitted on a research into welding or its applications. The prize is from a fund supplied in 1948 by the British Oxygen Co., Ltd. Candidates must not be older than 35 years of age on January 1, 1950. Papers should not be more than 5000 words, and copyright of the winning entry shall become the property of the BWRA.

Trade Unions and Chemists

A protest against the presidential address of Professor J. W. Cock to the RIC in Glasgow (THE CHEMICAL AGE, *62*, 501-2) when he deplored the pressure being placed on chemists to join trade unions, has been made by the Association of Scientific Workers, Scottish area. The association maintans that its aims are essentially the same as those of the Institute—improvement of the status of the scientist in industry—and that this can only be successfully achieved by trade union.

Oil Deposits in Scotland

The view that there might be a considerable amount of oil below Downholland Moss, Formby, was recently expressed by Dr. G. M. Lees, chief geologist of the Anglo-Iranian Oil Co., Ltd., at the launching at Birkenhead of the tanker *British Trust*. About 10 or 12 years ago, he said, oil was struck at a depth of about 100 ft. So far about 8000 tons of oil had been produced but it was believed there was a much larger accumulation in that district. The company had sunk three wells, one of them to a depth of 7500 ft.

· PERSONAL ·

PROFESSOR T. P. HILDITCH, of Liverpool University, was on April 4 elected hon. vice-chairman of the Liverpool and North-Western Section of the Royal Institute of Chemistry at the annual meeting at Liverpool University. DR. M. CRAWFORD, head of the Chemistry Department of the Wigan Mining and Technical College, was elected chairman, and MR. B. D. W. LUFF, vice-chairman. Mr. Luff was re-elected hon. treasurer, and MR. J. ASHLEY-JONES was re-elected hon. secretary.

SIR EDWARD APPLETON, principal of the University of Edinburgh, and ALEXANDER ROBERTUS TODD, professor of organic chemistry in the University of Cambridge, are among those on whom the Senate of Glasgow University is to confer honorary degrees.

The Senate of London University has conferred the title of Fellow of the University College, London, on PROFESSOR J. W. COOK, president of the Royal Institute of Chemistry and Regius Professor of Chemistry, Glasgow.

PROFESSOR FRANK BELL, D.Sc., Ph.D., F.R.I.C., head of the department of pharmacy and chemistry at Belfast College of Technology has been appointed to the Chair of Chemistry at the Heriot Watt College, Edinburgh. He will take up duty on September 1. Professor Bell has had a distinguished career serving at Battersea Polytechnic and the Blackburn and Lancaster Technical Colleges as principal, before taking up his Belfast appointment in 1946.

DR. D. H. R. BARTON has been appointed to the university readership in organic chemistry tenable at Birkbeck College from October 1; the title of reader in chemistry has been conferred on DR. A. G. FOSTER, from the same date, in respect of the post held by him at Royal Holloway College.

SIR HENRY DALE has been appointed adviser to the BBC on scientific programmes, for a year beginning July 1. He will give advice on the content and co-ordination of broadcast talks on science and will also examine the possibilities of developing scientific programmes for television.

MR. G. W. LACEY (director, British Aluminium Co., Ltd.) and DR. W. J. WORBOYS (I.C.I. Plastics Division) have been re-appointed members of the Council of Industrial Design. New members appointed to the Council include SIR WILLIAM PALMER (chairman, British Rayon Federation), and MR. A. WHITAKER (chief research and design engineer, Ascot Gas Water Heaters, Ltd.).

The Institute of Packaging announces the appointment of the following officers for 1950/51: MR. JOHN EVAN COOK, joint managing director of Evan Cook's Packers, Ltd., has been elected the first chairman; vice-chairman, MR. E. H. DICKENS. Council: T. DYKE, A. F. MUCH and A. ROGERS re-elected, with the following additional members: J. CASTLE (Eburite Corrugated Containers, Ltd.), K. M. CAVE (British Drug Houses, Ltd.), J. J. FERRIGI (Shell Petroleum Co., Ltd.), and E. G. O. RIDGWELL (G.E.C., Ltd.).

M. CAQUOT (France) has been elected president of the International Organisation for Standardisation (ISO) in succession to Mr. Howard Coonley (U.S.A.). Well known as a civil engineer, M. Caquot's achievements include the construction of a number of important French bridges in reinforced concrete.

MR. ROBERT T. HASLAM, a vice-president and a director of Standard Oil Company (New Jersey), plans to retire in the autumn and has asked not to be nominated for re-election as a director. Prior to becoming a member of the board of Standard Oil Development Company, in 1927, he was assistant professor and head of the School of Chemical Engineering Practice at the Massachusetts Institute of Technology, and for several years directed the research laboratory of applied chemistry there. His book, "Fuels and Their Combustion," is one of the standard works on the subject; he is also co-author of "Britain's Fuel Problems."

MR. WALTER DENT REDMOND, Rufford, near Ormskirk, managing director of Garston Bottle Co., and a director of several chemical and brick companies, left £36,064 (£32,547 net).

Federation News : Food and Agriculture Chemists

THE inaugural meeting of the Crop Protection Panel, Agricultural Group of the Society of Chemical Industry will be held on Thursday, April 27, at 6.0 p.m. at the Royal Institution, Albermarle Street, London, W.1.

It is understood that the panel will act as an authority on the problems, particularly the chemical problems, involved in the protection of crops, but its interests will also include livestock and stored products.

The chairman of the panel will be Dr. L. H. Lampitt and the secretary Mr. W. E. K. Piercy.

A paper on "Advances in Chemical methods of Crop Protection" will be presented by Dr. Hubert Martin (Long Ashton Research Station).

SCI Food Group

THE report for 1949-50 of the Food Group of the Society of Chemical Industry, presented at its annual general meeting on April 12, revealed that membership had increased by five during the 12 months ended January 1, the total being 1074. In the same period the Microbiological Panel increased its membership by 10 and the Nutrition Panel by 40. Membership of the former at January 1 was 437 and of the latter 360.

Arrangements for the next session are already well in hand. The summer tour will begin on Saturday, June 3, when a party leaves for Norway. The tour will be centred in Oslo for four days and in Bergen for a day and a half.

Plant Manufacturers' Officers

AT the recent annual general meeting, in London, of the British Chemical Plant Manufacturers' Association, the following officers were appointed for 1950: Chairman, Major V. F. Gloag, M.C. (Simon-Carves, Ltd.); vice-chairmen, Mr. N. C. Fraser (W. J. Fraser & Co., Ltd.), Mr. W. J. Hooton (S. H. Johnson & Co., Ltd.), Mr. H. V. Yorke (Bennett, Sons & Shears, Ltd.); hon. treasurer, Mr. P. W. Seligman (The A.P.V. Co., Ltd.); other members of council, Mr. W. R. Beswick (Ashmore, Benson, Pease & Co., Ltd.); Mr. B. L. Broadbent (Thos. Broadbent & Sons, Ltd.); Dr. G. E. Foxwell (Clayton, Son & Co., Ltd.); Mr. E. S. Franklin (Torrance & Sons, Ltd.); Mr. K. Fraser (W. J. Fraser & Co., Ltd.); Mr. A. G. Grant (Whessoe, Ltd.); Mr. J. C. Haithwaite (John Thompson (Dudley), Ltd.); Mr. G. N. Hodson (Hathernware, Ltd.); Mr. A. M. Hutcheson (Thompson Bros. (Bilston), Ltd.; Dr. R. Lessing (The Hydronyl Syndicate, Ltd.); Mr. B. N. Reavell (Kestner Evaporator & Engineering Co., Ltd.); Mr. J. Arthur Reavell (Kestner Evaporator & Engineering Co., Ltd.); Mr. G. W. Riley (Geo. Scott & Son (London), Ltd.); Dr. R. Seligman (The A.P.V. Co., Ltd.); Mr. E. Smyth (Peter Brotherhood, Ltd.); Mr. R. F. Stewart (Dorr-Oliver Co., Ltd.); Mr. S. G. Watson (W. C. Holmes & Co., Ltd.); Mr. J. W. Wright (Cannon Iron Foundries, Ltd.).

OBITUARY

DR. J. A. CROWTHER, Emeritus Professor of Physics in the University of Reading and vice-president of the Institute of Physics, died at his home at Treyarnon Bay, Cornwall, on March 25.

The professor was noted for his work in radiology, being an honorary member of the Faculty of Radiologists, and, in 1936, president of the British Institute of Radiology. In 1924 he published a textbook on "Principles of Radiography," and 20 years later—two years before he retired—he edited the "Handbook of Industrial Radiology." Other textbooks followed.

In 1920 Professor Crowther co-operated in the foundation of the Institute of Physics, of which he was honorary secretary from 1932-1946, and later vice-president until the time of his death.

On his appointment to the Chair of Physics at Reading in 1924, he set about building up a small research school to investigate the action of X-rays on those physical systems such as colloids which are related to living matter. This work was enlarged in 1935 under the auspices of British Empire Cancer Campaign.

His interest in the properties of X-rays and the radiations from radioactive substances was derived from Sir J. J. Thomson at Campridge, and in the six years following 1906 he published 16 papers on the passage of X-rays and beta-rays through material media.

Next Week's Events

MONDAY, APRIL 17

Society of Chemical Industry

London: 26 Portland Place, W.1, 6.30 p.m. (Plastics and Polymer Group). Dr. D. Cleverdon and Mrs. D. Laker (Distillers Co., Ltd.): "The Molecular Weights of High Polymers—1, The Technique of Osmometry; 2, Some Consequences of Comparing Osmometric and Other Molecular Weights."

Royal Institute of Chemistry

Hull: Royal Station Hotel. 7.30 p.m. Dr. R. Holroyd: "The Chemistry of Aviation Petrol."

The Radio and Electronic Component Manufacturers' Federation

London: Grosvenor House, Park Lane, W.1, 10 a.m. to 6 p.m. (also Tuesday and Wednesday). Seventh private exhibition of British components, valves and test gear.

Swiss Industries Fair

Basle: Daily—until April 25.

Lyons International Fair

Lyons: Daily—until April 24.

TUESDAY, APRIL 18

Manchester Building Trades Exhibition

Manchester: City Hall, Deansgate. Daily—until April 29.

Society of Dyers and Colourists

Glasgow: St. Enoch Hotel, 7.30 p.m. C. L. Bird and O. Newsome: "The Application of Logwood to Wool."

Society of Chemical Industry

Birmingham: (Birmingham and Midland section). Conference on "Materials of Construction"—until April 20.

The Institute of Physics

Birmingham: University, Edgbaston. Exhibition of Vacuum Equipment (Two days).

Textile Institute

Morley: Town Hall, 10 a.m.-5 p.m. One-day conference on "The Reclamation of Fibres."

WEDNESDAY, APRIL 19

Royal Institute of Chemistry

London: University College, Gower Street, W.C.1, 3 p.m. (Jointly with SCI). "The Physical Chemistry of Drug Action—a Symposium." Prof. Sir Cyril Hinchelwood: "Introductory Observations"; Prof. F. A. Paneth: "The Use of Tracer Elements in Pharmacology"; Prof. A. Albert: "Ionisation: An Important Factor which is Sometimes Critical"; H. R. Ing: "The Effect of Spatial Factors in the Activity of Drugs."

The Plastics Institute

London: Waldorf Hotel, Aldwych, W.C.2, 6.30 p.m. Dr. C. A. Redfarn: "PVC Leathercloth."

Royal Statistical Society

Newcastle-on-Tyne: 18 Lovain Place, Newcastle. Chemical Industries Club, 6.30 p.m. D. J. Desmond: "Specifications and Tolerances."

Electrodepositors' Technical Society

Eastbourne: Grand Hotel. Silver Jubilee Conference. (Until Saturday, April 22). Five technical sessions, social and other activities.

THURSDAY, APRIL 20

Sir John Cass College

London: Jewry Street, Aldgate, E.C.3, 6 p.m. Eric Walker (Barrister-at-Law, Gray's Inn): "Trade Marks," first of a series of four lectures.

FRIDAY, APRIL 21

Society of Chemical Industry

London: King's College, Strand, W.C.2, 7 p.m. Annual general meeting, 7.30 p.m. Dr. L. P. Walls: "The Chemistry of Trypanocides," followed by a discussion, opened by Dr. E. M. Lourie.

Oil and Colour Chemists' Association

Birmingham: Chamber of Commerce, New Street, 6.30 p.m. (Midlands Section). Annual general meeting and smoker.

Institute of Physics

Chislehurst: 2.30 p.m. (London and Home Counties Branch). Visit to the laboratories of the British Scientific Instrument Research Association.

Society of Public Analysts and Other Analytical Chemists

Cambridge: Physical Chemistry Laboratory, Free School Lane, 5 p.m. Meeting of Physical Methods Group. Dr. G. Jessop: "The Indirect Determination of Aluminium"; Dr. W. Cule Davies: "The Ilkovic Equation—Its Present Status"; C. H. R. Gentry: "An Electronic Polarometer for Metallurgical Purposes."

SATURDAY, APRIL 22

Institution of Chemical Engineers

Manchester: College of Technology, 3 p.m. (North Western Branch). G. E. Charlish and E. J. Heeley: "Acid Resistant Vitreous Enamelled Chemical Plant—Some Observations on the Enamel Layer."

OVERSEAS

Non-Toxic Insecticide

The U.S. Department of Agriculture is the patentee of the new non-toxic insecticide, Allethrin, now being made in limited quantities by John Powell, Inc., New York. Technically described as the allyl homologue of Cinerin 1, it might largely replace pyrethrum if its present production cost was not extremely high.

Yugoslavia to Produce Coke

The manufacture of coke is to be started in Yugoslavia this year. In 1947, a Yugoslav engineer, Mr. Popovic, discovered that coke could be made from home-mined lignite and work was started last year on the erection of coke ovens at Lukovac, where extensive lignite deposits occur. A separation plant is also under construction.

U.S. Tests of Antibiotic

Terramycin, an antibiotic isolated last year in the research laboratories of Chas. Pfizer & Co. (U.S.A.) is reported to be highly effective against a wide variety of pathogenic micro-organisms. Clinical evaluation is now in progress to discover the efficacy of the drug against pneumococcal pneumonia, virus pneumonia, undulant fever, whooping cough, typhus fever and other diseases.

Synthetic Vitamin A

Potent competition with the natural production of vitamin A, from fish livers, etc., is expected to result from large-scale production by the Hoffmann-La Roche company in New Jersey, U.S.A., of a synthetic form of the vitamin. Other groups, reports *Chemical Engineering*, are expected shortly to collaborate in employing the new process, which is stated to yield a tasteless product which can be sold for 30c. per million units.

Indian Bauxite Deposits

By the discovery recently of large deposits of bauxite in the Belgaum and Kolhapur districts of Bombay State, India's known high-grade bauxite reserves, amounting to 35 million tons, have, according to Indian geologists, been increased by a further 3 million tons. Mr. B. C. Roy, Government of India Geologist, who superintended the investigation, is reported to have recommended a programme of prospecting and assessment of the resources, the development of which would, however, depend to a large extent on the completion of hydro-electric projects in the region.

Yugoslavia to Exploit Oil-Shale Resources

Plant and equipment for the mining and processing of oil shales is being installed near Aleksinao, Yugoslavia, where last year large reserves were proved to exist. Surface deposits alone are reported to be sufficient to support five years' intensive exploitation.

Ownership of U.S. General Aniline

The Washington Federal District Court has dismissed the claim of Remington-Rand, Inc., that it possessed an option to acquire for $25 million a controlling interest in the General Aniline and Film Corporation, which the U.S. Government seized as enemy property during the war. The claim of ownership by I.G. Chemie (Interhandel) is still outstanding.

A New Boron Hydride?

Effective use of the mass spectrometer is reflected in the claim by Dr. Francis J. Norton (General Electric research laboratories, Schenectady, New York) to have established the existence of unknown compounds of boron and hydrogen. A boron hydride containing boron of mass 11 which had been stored at 108° F. below zero had partly decomposed, one of the products appearing to be a stable compound, B_nH_{12}.

A New Air Filter

A filter material for separating fine radioactive particles from contaminated gaseous wastes has been developed for the U.S. Atomic Energy Commission by Arthur D. Little, Inc., Cambridge, Massachusetts. It consists of a combination of treated paper-making fibres and finely divided mineral asbestos fibres, and is made in soft, flexible sheets which are fitted into wooden frames. The filter may have wide use in the treatment of industrial fumes.

Emergency Gas Supply

Proposals which it was claimed would meet the peak load demands in the U.S.A. for natural gas for heating, were described at the last national meeting of the American Chemical Society. Dr. R. M. Deanesly (Universal Oil Products Company) urged that " emergency gas " should be produced by the autothermic cracking process, using propane or similar volatile hydrocarbon and air. Preheated separately to over 1000° F., mixed and allowed momentarily to react, they produce a gas of good burning characteristics and scarcely any of the thermal value is lost.

The Stock and Chemical Markets

BUSINESS this week in stock markets has been restricted by a general tendency to await next Tuesday's Budget statement. It is expected that there will be no important reduction in the burden of taxation.

British Funds again showed moderate improvement, but industrial shares remained uncertain, partly because of the belief that dividend limitation will continue for another year.

Shares of chemical and kindred companies were generally well maintained, with Imperial Chemical at 43s., while Monsanto were 47s. 6d. and Albright & Wilson changed hands around 28s. 9d. British Glues and Chemicals 4s. shares at 20s. 7½d. held their recent rise, and Laporte Chemicals 5s. units changed hands at 9s. 6d. Turner & Newall have been steady at 77s. 9d., United Molasses at 40s. were active in anticipation of good financial results, and Borax Consolidated deferred were 51s. 6d.

Fisons were 21s. 6d., at which there is a large yield on the basis of last year's 12 per cent dividend; the company's new 4¼ per cent mortgage debentures were quoted at 7s. 6d. premium over the issue price of £98. Associated Cement shares strengthened to 78s. and Rugby Cement 5s. shares were 17s. 4½d.

Amalgamated Metal shares remained under the influence of the financial results and changed hands around 19s. 7½d. There was, however, uncertainty again among shares of companies connected with plastics. De La Rue were down to 20s., at which these 5s. shares yield over 12 per cent on the basis of last year's 50 per cent dividend. British Xylonite fluctuated around 65s. 3d. and, elsewhere, the 4s. units of the Distillers Co. were 6d. better at 17s. 6d. Lever & Unilever were easier at 39s. 6d., but British Oxygen have been steady at 94s., awaiting the full financial results.

Triplex Glass 10s. shares remained at the slightly lower level of 17s. 9d., probably affected by doubts about future dividend limitation. Triplex has a strong balance sheet position, which would justify a liberal dividend policy in a good year; and there are no debentures or preference shares ranking in front of the ordinary shares.

United Glass Bottle kept at 68s. 9d., awaiting the financial results. Earnings have for many years been well in excess of dividends paid; sooner or later it would seem shareholders will have a larger return. Recognition of this and the company's strong balance sheet position explains why the shares are valued in the market to show a yield of little more than 4½ per cent.

Boots Drug shares have been more active around 46s. 9d. Iron and steels have been firm, with few important movements. Dorman Long were 29s. 6d., United Steel 24s. 3d., and Stewarts & Lloyds 50s. 6d. Staveley changed hands around 75s. 6d. In other directions, Glaxo Laboratories have been firm at 46s. 10½d.

Oils failed to hold best levels, but were more active. Shell were 66s. 3d. and Anglo-Iranian changed hands around £7⅛.

Market Reports

INTEREST in the chemical market during the past week has been chiefly concerned with routine deliveries against contracts. New business has been on a fairly good scale, despite the influence of the Easter holiday, and the seasonal demand for fertilisers has continued without interruption. A good call for supplies of tartaric and citric acids is also reported. There has been a steady flow of overseas inquiry and the export trade demand shows little change. The price of butyl alcohol was reduced by £5 per ton as from April 3 and an advance in the price of refined glycerine came into operation on April 1. This advance is due to the need to import crude glycerine at world prices, which are higher than those prevailing in the United Kingdom. Trade in the coal tar products is a little better and a fair amount of export trade is being secured on competitive quotations. Xylol supplies are not easier and the demand continues to be sustained.

MANCHESTER.—Business in the Manchester chemical market was resumed on a quietly steady scale after the holiday break, although up to the present there has been no more than a moderate volume of new bookings reported. The textile and allied trades in Lancashire and West Riding have been calling for steady deliveries of alkali and other heavy chemicals against existing contracts and a satisfactory movement of supplies to other principal outlets is also recorded. Prices as a whole remain on a strong basis. In the fertiliser trade there is a growing demand for superphosphates, sulphate of ammonia and compounds.

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Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

CLAY & SON, LTD. London E. (M., 15/4/50.) Fertiliser manufacturers, etc. March 13, charge, to Midland Bank, Ltd., securing all moneys due or to become due to the Bank; general charge. *£6000. October 15, 1947.

DUC-O-PLASTIC FINISHES, LTD. (formerly Duc-o-Plastic Finishers, Ltd.). (M., 15/4/50.) March 14, £200 deb., to L. Calo, Brighton; general charge.

Satisfactions

BRITISH CELANESE, LTD. London, W. (M.S., 15/4/50.) Satisfaction March 15, of deb. stock reg. September 24, 1946, to the extent of £10,465.

PRECISION TOOL & INSTRUMENT CO., LTD., London, W.C. (M.S., 15/4/50.) Satisfaction March 15, of mort. reg. May 30, 1935.

YEOVIL DEGREASING CO., LTD., London E.C. (M.S. 15/4/50.) Satisfaction March 14, of debs. reg. November 19, 1948, to the extent of £2000.

New Registration

Gregory, Hancox & Co., Ltd.

Private company. (480,280). Capital £2000. Soap, chemical and polish manufacturers. Directors: J. Gregory, W. Hancox. Reg. office: Easiclene Works, Hall Street, Blackburn.

Company News

Doulton & Co., Ltd.

Net profit, after all charges, of Doulton & Co., Ltd., was £154,750 (£82,139). The 12½ per cent ordinary dividend is maintained and there is an additional 2½ per cent bonus for 1949. Fixed asset replacement reserve is raised by £75,000.

Agents for Swedish Chemicals

Guest Industrials, Ltd., which last year was appointed British selling agents for Bofors Nobelkrut of Sweden, is now dealing in a large variety of fine and industrial chemicals, synthetic resins and dyestuff intermediates, etc. It is recalled that the Bofors company was founded in the 15th century and that its name has become synonymous with guns, armaments and explosives. During recent years, Bofors has greatly extended its field of activity. In the late 19th century the company was joined by Dr. Alfred Nobel, whose name is perpetuated by the Nobel Prize.

Large Chemical Expansion Proposed

Two very large chemical plants to manufacture bromine and tetraethyl lead are planned for the North of England. Chemists are surveying sites in Anglesey and near Ellesmere Port, Cheshire in furtherance of plans being made by the Associated Ethyl Co., Ltd., which already has plant in Cornwall and Cheshire. "The project will comprise plant for the production of tetraethyl lead, metallic sodium, ethyl chloride, ethylene diochloride and the extraction of bromine from sea water," a company statement recorded on April 3. It is hoped the plants will begin operating early in 1953. The firm's chemists are believed to be examining a site at Almwch on the Anglesey coast, where the amount of salt in the water is higher than in most places.

Whale Oil Totals

IT is estimated that the five nations participating in this season's Antarctic whaling have produced about 1.8 million barrels of whale oil, in addition to which there will be some 200,000 barrels of sperm oil and also the catch of the three shore stations, states the Norwegian newspaper *Aftenposten*. Total output last season was 2.2 million barrels, and it is likely that this season's output will not appreciably exceed this amount.

Norway's combined output from pelagic, shore, and sperm whaling this season is expected slightly to exceed 1 million barrels, which is equal to about 170,000 tons. About 70,000 tons will be exported in its raw state, including 50,000 tons sold to the British Ministry of Food for £80 a ton. Last year, unprocessed whale oil was sold at £100 a ton. The remaining 100,000 tons of the Norwegian whale oil production will be processed in Norway.

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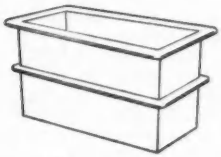
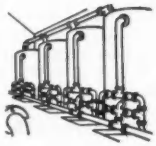
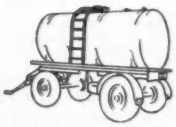


Chemical Tanks



Storage Vessels



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Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Method of preparing rubbery vulcanisable polymeric materials.—B. F. Goodrich Co. May 19 1947. 637,388.

Oxo synthesis process.—Standard Oil Development Co. May 29 1947. 637,389.

Production of protective or paint-holding coatings on aluminium or aluminium alloys.—Pyrene Co., Ltd., H. A. H. Jenkins, and W. E. Wright. June 24 1948. 637,249.

Magnetrons.—Compagnie Générale de Télégraphie Sans Fil. June 10 1947. 637,455.

Process for preparing halogen-containing unsaturated aliphatic nitro-compounds.—N.V. De Bataafsche Petroleum Maatschappij. June 30 1947. 637,252.

Co-polymerisation of substances containing allyl compounds.—Metropolitan-Vickers Electrical Co., Ltd., and W. Simpson. March 2 1948. 637,464.

Explosive compositions containing a water-soluble inorganic salt.—E. I. Du Pont de Nemours & Co. July 25 1947. 637,200.

Polymers and method of producing same.—B. F. Goodrich Co. Aug. 1 1947. 637,395.

Apparatus for separating grease, oils and fats from waste water.—R. H. Newman, and M. P. Hirshstein. Aug. 21 1947. 637,399.

Nitroolefine derivatives of malonic esters and process for preparing same.—C. T. Bahner. Sept. 9 1947. 637,400.

Synthetic resins.—I.C.I., Ltd., H. Brunner, and D. R. Tucker. Sept. 3 1948. 637,262.

Separation of pteroylglutamic acid from related pterins.—American Cyanamid Co. Sept. 26 1947. 637,330.

Manufacture of organic esters of cellulose.—J. F. Neilson, and J. A. Hawkes. Oct. 28 1948. 637,267.

Process of preparing benzene hexachloride.—Solvay & Cie. Nov. 5 1947. 637,412.

Distillation of synthetic alcohols.—Enjay Co., Inc. Nov. 28 1947. 637,414.

Thermal polymerisation of alpha-methyl styrene.—Distillers Co., Ltd., H. C. Highet, F. E. Salt, and H. M. Stanley. Feb. 1 1949. 637,346.

Creep resisting alloys and manufacture thereof.—Soc. Anon. de Commentry-Fourchambault & Decazeville. April 4 1945. 637,711.

Production of metal powders.—E. H. E. Johansson, and C. M. Truedsson. Dec. 14 1945. 637,714.

Metal alloys.—Westinghouse Electric International Co. May 9 1946. 637,786.

Separating thiophene from benzoles by distillation.—Soc. Des Etablissements Barbet. June 28 1946. 637,720.

Methods for extracting alumina from raw anhydrous calcium aluminates.—Soc. Des Ciments Français. Aug. 28 1946. 637,578.

Preparation of beta-aroxy carboxylic acid compounds.—B. F. Goodrich Co. Aug. 29 1946. 637,724.

Processes for the manufacture of magnesia containing refractory materials.—Soc. De Recherches et D'Entreprises Industrielles et Chimiques. Oct. 17 1946 637,794.

Merocyanine and oxonol dyes and process for their preparation.—General Aniline & Film Corporation. Nov. 25 1946. 637,648.

High clarity cellulose esters.—British Celanese, Ltd. Dec. 20 1946. 637,650.

Process for the manufacture of oleum.—P. Guareschi. Jan. 16 1947. 637,585.

Processes for preparing substances comprising paraffin wax.—N.V. Philips' Gloeilampenfabrieken. Jan. 30 1947. 637,586.

Liquid oxygen converters.—W. A. Wildhack. Feb. 4 1947. 637,514.

Production of gamma benzene hexachloride.—H. L. De Waal. Feb. 24 1947. 637,732.

Resinous coating composition.—Wingfoot Corporation. March 3 1947. 637,733.

Art of stabilising rayon type fabric.—Alrose Chemical Co. March 17 1947. 637,656.

Trade Mark Registration Opposed

In the Chancery Division before Mr. Justice Vaisey, Gardinol Chemical Co., Ltd., of New Street, Milnsbridge, Huddersfield, unsuccessfully appealed against the refusal of the Registrar of Trade Marks of their application to have a German company's registration of the trade mark "Lanette" removed from the register. The trade mark was in respect of the wax, of considerable technical importance, used in the medicinal, cosmetic and pharmaceutical trades.

CENSUS OF PRODUCTION

Board of Trade Intentions

THE scope of the Census of Production for 1950 and the information to be obtained have now been settled, after consultation with the Census of Production Advisory Committee.

The statutory form of return, says a Board of Trade statement, will contain sections relating to (1) Working proprietors; (2) Employment; (3) Wages and salaries, etc.; (4) Materials and fuel purchased; (5) Work given out; (6) Stocks at the beginning and end of the year; (7) Output and merchanted goods sold; and (8) Analysis of sales. The first five of the sections will be broadly as for 1949, but only the year's total of wages will be required.

In the output section, firms will also be asked to state separately the total value of sales of their own manufactures, and the total payment received for work done.

A voluntary inquiry into capital expenditure is being undertaken by the Board of Trade and other departments among a sample of industrial firms and it has been decided that, if this inquiry meets with a satisfactory response, no questions about capital expenditure need be included in the Census of Production for 1950.

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"Moonshine" **WHISK** or **MIXER,** comprising open-top Vertical Mixer having mild steel container 12 in. diam. by 14 in. deep, bottom jacketed, with horizontal high-speed whisk driven through gearing from fast and loose pulleys 8 in. diam. by 2½ in. face.
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One—**BELT-DRIVEN PELLETING PRESS,** by Duncan Stewart; at present fitted with dies and punches for 2½ in. diam. by approx. ½ in. thick tablets, 30 per minute output; punch stroke 3 in. ejector 1½ in., driven through fast and loose pulleys 25½ in. diam. by 4½ in. face; Tecalemit lubrication throughout; feed hopper, discharge chute and wire mesh guard.
One—Small **TABLETING MACHINE** by Thos. & Capper, adjustable stroke and filler, driven through fast and loose pulley, tablets up to ½ in.
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No. 201 One **DITTO.**

No. 202 One **DITTO.**

No 204 One **WERNER PFLEIDERER MIXER OR INCORPORATOR,** similar to the above, with a C.I. built pan 25 in. by 25 in. by 19 in. deep, belt pulleys 26 in. diam. by 5 in. face, double fin-type agitators, and mounted on C.I. legs.

No. 205 One larger **WERNER-TYPE MIXER OR INCORPORATOR,** by Dobson & Barlow, with C.I. built pan or mixing chamber, of the double "U" type, 4 ft. 6 in. by 3 ft. 7 in. by 3 ft. 10 in. deep, with a jacketed bottom and sides to within about 12 in. of top, and fitted with double "Z" type agitators, counterbalanced cover, machine-cut gears at each side, steel back-frame with counterbalancing weights and self-contained belt-driven tipping gear and main triple fast and loose belt pulleys 30 in. diam. by 6½ in. face, with belt fork. Approximate overall sizes, 12 ft. long by 8 ft. wide by 10 ft. high.

No. 206 One **DITTO** of the same pattern, by **DOBSON & BARLOW**

No. 208 One **DITTO** by **WERNER PFLEIDERER,** with a C.I. built pan or mixing chamber, of the double "U" type, 4 ft. 5 in. long by 3 ft. 8 in. by 33 in. deep, with double "Z" mixing arms, gears at each end, hand-operated tilting gear, with steel backframe, counterbalancing weights and chains, and fast and loose pulleys 3 ft. diam. by 6 in. face.

No. 209 One **HORIZONTAL "U"-SHAPED MIXER,** steel built, riveted, measuring about 8 ft. 3 in. long by 3 ft. wide by 3ft. 3 in. deep, with horizontal shaft, fitted with bolted-on mixing arms about 18 in. long by 4 in. wide, with intermediate breakers, and driven at one end by a pair of spur gears, with countershaft, fast and loose belt pulleys, outer bearing and plug cock type outlet at the opposite end, mounted on two cradles fitted to two R.S.J. running from end to end.

No. 210 One **HORIZONTAL MIXER** as above.

No. 211 One **HORIZONTAL MIXER** as above.

No. 212 One **HORIZONTAL MIXER** as above.

No. 213 One **HORIZONTAL MIXER** as above.

These five "U"-shaped mixers are in some cases fitted with steel plate covers and a steam jacket round the bottom and extending to within about 18 in. of the top with plain end plates.

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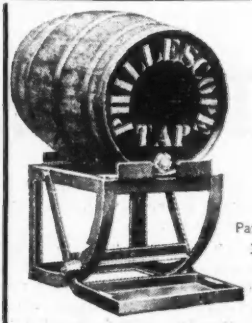

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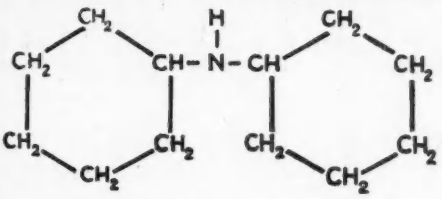

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